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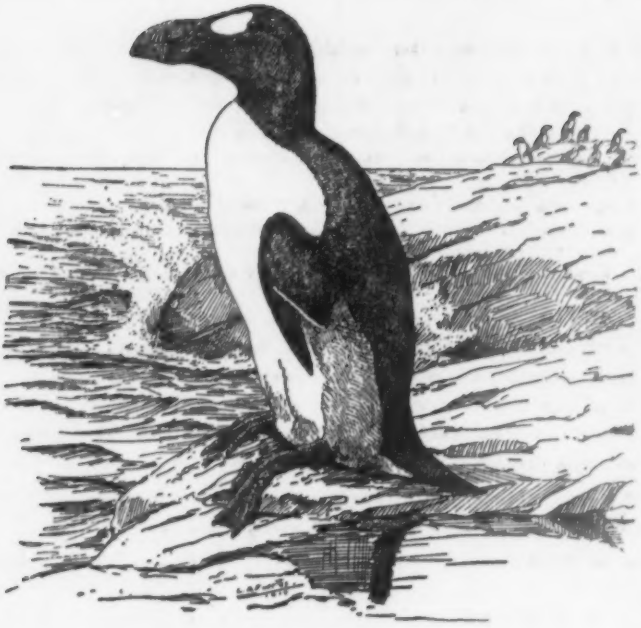

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THREE MEXICAN RACES OF THE TROPICAL PARULA WARBLER from a painting by Don R. Eckelberry. *(Top to bottom:* adult males of *Parula pitiayumi pulchra,* Sonora to Michoacán; *P. p. graysoni,* Socorro Id.; *P. p. insularis,* Tres Marias Is.)

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THE AVIFAUNA OF THE TRES MARIAS ISLANDS, MEXICO

BY KENNETH E. STAGER

THE bird life of the Tres Marias Islands, off the west coast of Mexico, has been of interest to ornithologists since the time it was first brought to their attention by Andrew Jackson Grayson in 1865. Known historically since early in the 16th century, the islands were visited by early maritime explorers and served as a base for buccaneers operating along the Pacific coast of Mexico. In spite of this long period of contact by seafaring men, the islands even today are rather poorly charted and there exists a great deal of erroneous information regarding the immediate waters surrounding this insular chain.

PHYSICAL FEATURES OF THE ISLANDS

The Tres Marias lie between 21° and 22° north latitude and 106° and 107° west longitude. Stated with reference to other well known Mexican mainland points, the islands lie approximately 125 miles south southwest of Mazatlan, Sinaloa, or 65 miles west of San Blas, on the coast of Nayarit, and are considered a part of this latter state. Although named the Tres Marias, the islands total four in number and from north to south are: San Juanito, Maria Madre, Maria Magdalena, and Maria Cleofas. A relatively shallow channel separates the group from the mainland of Mexico thus distinguishing them as continental rather than oceanic islands. The islands, (see map) aligned as they are in a northwest-southeast chain, are apparently the remnants of a former single island which was approximately 50 miles in length. Prior to the period of the single island, a long peninsula evidently extended northwestward from the northern tip of Banderas Bay in the present state of Jalisco. Maria Madre, the largest island of the group, is approximately 15 miles long by 8 miles wide with a long axial ridge that rises over 2000 feet in elevation.

FIGURE 1. Map of the Tres Marias Islands, showing highest elevation, in feet. Scale—1″ = 12 miles.

North of Maria Madre lies San Juanito, the smallest of the four islands and separated from Maria Madre by a shallow and treacherous channel. San Juanito is a relatively flat island 4 miles long and 3 miles wide with its highest elevation at the extreme north end. To the southeast of Maria Madre lies Maria Magdalena, the second largest of the group. Triangular in shape, Magdalena is roughly 8 miles in diameter and rises to an elevation of around 1500 feet. Maria Cleofas, the most southeasterly of the chain, is rather circular in shape with a diameter of nearly 4 miles and an elevation of over 1000 feet

at its eastern end. Scattered offshore around the four islands are numerous jagged islets, rocks, and pinnacles.

Ecological Conditions

Nelson (1899) gives a good description of the physiography and flora of the islands so it is not necessary to elaborate on these two subjects other than to add new information and correct certain erroneous statements. Since Nelson's visit to the islands in 1898, a Mexican federal penal colony has been established on Maria Madre at the site of the original settlement on the east side of the island. There is a large henequen mill in production on the north end of Maria Madre which is operated by convicts. The other three islands are completely uninhabited except San Juanito which is sporadically occupied by groups of convicts from Maria Madre, for the purpose of harvesting the leaves of the giant *Agave* for transportation to the henequen mill on Maria Madre. Small native fishing craft from the Mexican coast frequently put in to Maria Cleofas, as there is a good anchorage on the east side of the island. Sport fishermen from the United States often stop among the islands during their voyages along the Mexican coast.

About 1903, a number of Mexican white-tailed deer (*Odocoileus virginianus*) and domestic goats were liberated on Maria Magdalena (Hanna, 1926:72). Both the deer and the goats have become well established and were noted as common during our visit in April 1955. Magdalena is well covered with vegetation, and as of the above date, the goats do not seem to have caused any appreciable damage by their browsing.

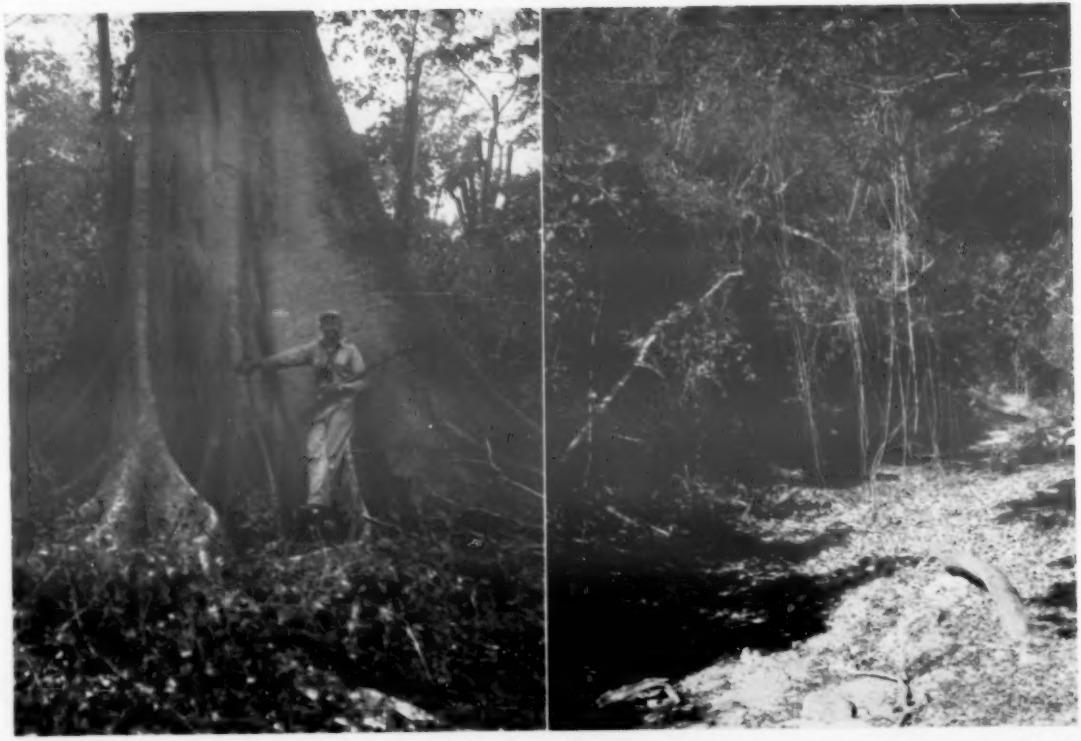
Destruction of native vegetation on the islands is most apparent on Maria Madre where, during the course of the past one hundred years, a great deal of logging has been done on the forested slopes. The most sought-after tree has been the Spanish cedar (*Cedrela*). The cultivation of agaves for henequen has also altered considerable areas of the island. At the present time there is extensive planting of introduced trees of various species. In the past there has been a relatively small amount of timbering on Maria Magdalena, but the original plant cover has not been altered to any noticeable degree. On San Juanito a network of harvest trails has been cut through the dense low scrub forest to facilitate the removal of henequen. These trails now enable a biologist to penetrate an otherwise difficult mat of vegetation. Maria Cleofas has a vegetative cover which is almost intact. Native fishermen occasionally put in at the east side of the island and remove single trees for the construction of dugout canoes.

Nelson's observations (1899) with regard to the vegetation of Maria Cleofas were obviously made from offshore as he states that the island is, "rocky and sterile and the trees are stunted and brushy." This statement is completely erroneous as our investigations revealed dense forests on the slopes and level land on the eastern side of the island. A periphery of low thorny vegetation just back of the shoreline gives the impression that the whole island is so covered. Beyond this periphery, however, which includes great patches of a large terrestrial bromeliad, a forest of considerable height is encountered. Trees of fifty feet in height are common and individuals of a large *Ficus* (Plate 19), 100 feet tall and with buttressed bases 30 feet in diameter, are to be found. This untouched climax forest can hardly be termed as "stunted and brushy." The floor of the forest is relatively open with an abundance of cycads (*Zamia* sp.) scattered throughout. Arboreal bromeliads and orchids are not uncommon.

Ornithological Investigations

Ornithological investigation of the Tres Marias began with the three visits of Andrew Jackson Grayson (1871) in 1865, 1866, and 1867. Most of Grayson's specimens are labeled either specifically "Maria Madre" or just "Tres Marias Islands" and it is difficult to determine whether he actually collected on any of the islands other than Maria Madre. Most of the material of his island collection is in the U. S. National Museum. The islands were not visited by an ornithologist again until in 1881 when Alfonse Forrer visited Maria Madre and made a collection of birds, the greater part of which is presumed to be in the British Museum. Forrer's collection has never been reported upon except for references most of which are in the British Museum Catalogue of Birds and Salvin and Godman's Biologia Centrali-Americana (1879–1904).

In 1897, Nelson and Goldman spent the month of May investigating the three main islands of the group. Their itinerary indicates that they remained on Maria Madre from May 2 to May 25 and then moved to Maria Magdelena for 3 days (May 26 to 28) and to Maria Cleofas for 2 days (May 29 and 30). Nelson (1899: 8) mentions that as he and Goldman were preparing to depart from San Blas for the Tres Marias they were met by "a Prof. C. L. Herrick, his son, Harry, and Dr. T. S. Maltby from Socorro, New Mexico," who also were bound for the islands. The two parties joined and made the trip together. Nelson makes no further mention of the Herrick party, but that their visit to the islands was also of an ornithological nature is shown by the fact that the Rothschild collection, purchased by the



VEGETATION OF THE TRES MARIAS ISLANDS, APRIL, 1955. (*Left*) A Giant Fig (*Ficus* sp.) in the forest on the east side of Maria Cleofas. (*Right*) Dry stream course on the south drainage of Maria Magdalena showing abundance of vines and lianas.

VEGETATION OF THE TRES MARIAS ISLANDS, APRIL, 1955. (*Above*) Dense thorn and cactus thickets at shoreline on southeast side of Maria Magdalena. (*Below*) Forested interior of Maria Cleofas showing cycads (*Zamia* sp.) in foreground.

VIEWS OF THE TRES MARIAS ISLANDS, APRIL, 1955. (*Above*) Nesting colony of Blue-footed Boobies back of beach on southeast side of Maria Cleofas. (*Below*) Profile of heavy forest on southeast side of Maria Magdalena.

VIEWS OF SAN JUANITO ISLAND. (*Above*) Low, dense forest covering the island. View to the southeast showing Maria Madre in the background. (*Below*) North end of the island showing greatest elevation. Brown Pelicans use this pile of rocks as a nesting site.

American Museum of Natural History, contains a collection of between 200 and 300 birds from the Tres Marias, collected by C. L. Herrick between May 2 and 30, 1897. As in the case of Forrer's collection, this collection by Herrick has never been reported upon. I have examined a considerable amount of the Herrick material, but do not feel that I have uncovered all of the species his party may have collected.

For the next 28 years the islands remained untouched by ornithologists. On May 13, 1925, a field party from the California Academy of Sciences landed on Maria Madre and collected birds from May 13 to May 19, returning again on May 23 and 24. The period of May 19 to 22 was spent on nearby Maria Magdalena. Loye H. Miller and Alden H. Miller landed on Maria Madre June 26, 1925 and collected for three hours. The few skins taken by them in the vicinity of the penal colony on the east side of the island are in the collection of the University of California at Los Angeles. During the following October, McClellan (1927) spent six days (Oct. 21 to 26 inclusive) collecting birds on Maria Madre Island for the California Academy of Sciences. In 1926, the late A. E. Colburn evidently spent a little time in the island group. There are two specimens of the Western Willet (*Catoptrophorus*) bearing his name as collector in the Ed N. Harrison Collection labeled, "Maria Magdalena Island, November 29, 1926." The islands were not visited by ornithologists again until 1938, at which time Wm. H. Burt and the late George Willett accompanied by J. R. Pemberton put into Maria Magdalena for two days (February 9 and 10, 1938) and then moved on to Maria Cleofas for two days of collecting on this little-visited island. The specimens collected by Willett are in the collection of the Los Angeles County Museum, those collected by Burt, in the University of Michigan Museum of Zoology.

The Los Angeles County Museum's field work in April and May of 1955, here recorded, is the latest known investigation of these interesting islands insofar as their avifauna is concerned.

The main objective of our visit to the Tres Marias in 1955 was to bypass the relatively well-worked main island of Maria Madre and concentrate on the other three islands of the group, which have received less attention from ornithologists in the past. Departing from Mazatlan, Sinaloa, on April 17, 1955 aboard the power yacht "Malibu," our field party, consisting of Mr. and Mrs. Maurice A. Machris, Mr. and Mrs. Hal Roach, Jr., Mr. Harry F. Burrell, cinema photographer and me, proceeded south to Isabel Island. Isabel, a small volcanic island, lying midway between the Tres Marias and the

Nayarit coast, was reached after dark that same day. Two days were spent on Isabel examining and photographing the extensive sea bird colonies that use this tiny island as a breeding ground. Maria Madre was reached on the evening of April 20, and the morning of the 21st was spent traveling about the island as guests of General Pedrajo, governor of the penal colony. The anchorage at the southeast end of San Juanito was reached early the same afternoon and a collecting party was put ashore. Collecting on San Juanito continued through April 22 after which the "Malibu" proceeded to the southeast side of Maria Magdalena. Field work on Maria Magdalena extended from April 23 to April 26 inclusive, with departure for Maria Cleofas on the afternoon of the 26th. An anchorage at the east side of Maria Cleofas was reached at dusk of the same day and collecting ashore was begun on the morning of April 27. Work on this southernmost island extended through May 1, 1955 with the "Malibu" returning to Mazatlan on May 2, thus concluding a relatively short but very profitable investigation of the three least-known islands of this insular chain.

In evaluating the distribution of bird life within this insular group and reviewing the findings of previous workers, the gaps in our knowledge of the ornithology of the Tres Marias becomes apparent and it is hoped that subsequent investigations will serve to clarify many existing problems with regard to ecology and speciation of the bird life of these interesting islands.

The Birds of the Tres Marias

The following species account deals only with those forms for which new information or observations have been obtained. No attempt has been made to discuss all species now occurring on the islands or those for which there are valid records of their presence only in the past. These are included, however, in the check list that follows this account.

Phaëthon aethereus mesonauta Peters, Red-billed Tropic-bird.—Tropic birds breed on all four islands wherever suitable nesting cliffs are available. The offshore rocks and islets along the western sides of the islands are the most frequented areas. Numerous birds were noted flying in and out of the rocky bluffs at the north tip of San Juanito.

Pelecanus occidentalis californicus Ridgway, California Brown Pelican.—Nelson (1898) mentions pelicans as being uncommon about the Tres Marias and not nesting. In April of 1955 nesting colonies of this species were noted on San Juanito and on Maria Cleofas. On San Juanito the colony is confined to the high area at the north tip of the island. On Maria Cleofas the colony was nesting in low trees on the northeast corner of the island.

Sula nebouxii Milne-Edwards, Blue-footed Booby.—Breeding colonies were found only on San Juanito and Maria Cleofas. On San Juanito this species was found nesting at the same site as that mentioned by Nelson (1899). Nests were located in the short grass just above the high tide line on the south side of the island. In April 1955 the colony consisted of approximately 200 pairs. On Maria Cleofas there is a colony in a similar grass-type site just above the beach (Plate 21) at the southeast anchorage. In both colonies, we found stages from fresh eggs to abandoned young practicing flying and grouping at the water's edge.

Sula leucogaster nesiotes Heller and Snodgrass, Brown Booby.—Hundreds of boobies of this species nest on the precipitous offshore islet on the northwest side of Maria Cleofas. This is the same colony as that reported by Nelson in 1899. Approximately fifty pairs were noted nesting on the cliffs at the north end of San Juanito.

Fregata magnificens rothschildi Mathews, Man-O-War Bird.—Common about the Tres Marias, but found nesting only on San Juanito and Maria Cleofas. A few pairs were noted perched on low bushes among pelicans at the north tip of San Juanito, and several pairs were found occupying nesting trees at the northeast corner of Maria Cleofas. Most of the Tres Marias birds apparently range westward from Isabel Island where there are extensive nesting colonies.

Ardea herodias Linnaeus, Great Blue Heron.—Herons of this species were noted along the shores and beaches of all four of the islands, but whether the species breeds on Tres Marias is not as yet determined. No specimens were taken, hence a subspecific determination is not possible at this time.

Coragyps atratus (Beckstein), Black Vulture.—Grayson (1871) and Nelson (1899) both failed to find *Coragyps* in the Tres Marias. McClellan (1926) however reported them as fairly common on the beach at Maria Madre. On this occasion they were found mixing with the flocks of *Cathartes* in the vicinity of the settlement on the east side of the island. The species was not noted on any of the four islands during our period of field work in 1955.

Cathartes aura teter Friedmann, Turkey Vulture.—In contrast to the preceding species, Turkey Vultures were observed in considerable numbers on all of the four islands. Although there are no published records of the species nesting in the Tres Marias, it would seem safe to list the species as breeding there, as it is a species of wide and plentiful distribution throughout the islands.

Chondrohierax uncinatus uncinatus (Temminck), Hook-billed Kite.—Hook-billed Kites have not been previously reported from the Tres Marias although the species is known to be resident along the opposing mainland coast. On April 26, 1955 while collecting on the south side of Maria Magdalena, I was attracted by the shrill calls of this species along a forested stream course, just back from the beach. The bird was calling loudly and repeatedly, but no other individual of the species was observed. The specimen when collected proved to be an adult female in non-breeding condition. An examination of a series of skins of this species shows a wide range of individual variation in coloration, but this particular specimen exceeds most of the examples by its decidedly rufous coloring. The entire ventral surface is heavily suffused with rufous, including the throat and under tail coverts. The barring on the breast is not as distinct as that of Sinaloa birds (Moore Collection), owing to this rufous condition. The terminal white band of the tail is narrower and the large white bands are rufous on their inner webs. The nuchal collar is bright rufous compared to the buff-colored collars of Sinaloa birds. The wing measures slightly smaller (278 mm.) than wings of mainland birds.

As Grayson, Nelson, and McClellan all failed to note the species in the Tres Marias and our work only yielded one specimen, the species must be listed as of accidental occurrence pending further field work in the islands.

Buteo jamaicensis fumosus Nelson, Tres Marias Red-tail.—Red-tails were observed on all the islands except San Juanito, but so sparingly as to indicate that the population is rather small. I have not had an opportunity to examine specimens of this insular subspecies critically, so cannot comment on its validity as a race.

Caracara cheriway pallidus Nelson, Tres Marias Caracara.—A common species on all islands of the group. In my opinion *pallidus* is a poorly defined race, as all birds examined from the Tres Marias prove to be somewhat darker than mainland birds rather than lighter as given by Nelson (1898) in his description of the race. The character for dorsal neck markings also fails to hold when island birds are compared with specimens from the mainland. There is a very slight size difference, the island birds being somewhat smaller.

Falco albigularis Daudin, White-throated Falcon.—Although Grayson's (1871: 269) sight record is probably quite accurate, this falcon has not been subsequently found by any other workers on the islands. A diligent search for the species in 1955 failed to disclose any trace of this small falcon, and it can only be listed as of accidental occurrence.

Lophortyx douglasii (Vigors), Douglas Quail.—On the morning of April 21, 1955 while driving along the road leading north from the penal colony on Maria Madre to the home of the governor of the island, at a place called Nayarit, it was necessary to stop the vehicle to enable a flock of approximately twenty-five quail to cross the road. The birds were quite undisturbed and passed within 15 feet of the car, thus permitting positive identification. The species is without doubt a plant on Maria Madre, as so obvious a species would have been detected by previous observers on this well-worked island. Unfortunately it was impossible to collect any specimens at the time and no subspecific determination is possible at this writing. Numerous officials, including the governor of the islands, were questioned as to the origin of the birds, but no one was able to shed any light on the subject. According to the governor, the birds have always been there. It is possible that the introduction may have been made around 1903, as that is the time that Hanna (1926) reports the introduction of deer (*Odocoileus virginianus*) and domestic goats on Maria Magdalena Island.

Pluvialis dominica dominica (P. L. S. Müller), American Golden Plover.—The Golden Plover has not previously been reported from the Tres Marias. During our investigations in April 1955, Golden Plover were noted on several occasions on the tidal shelf rock on the south side of Maria Magdalena Island. In each instance the birds were solitary, but numerous enough to list the species as of casual occurrence. A female taken on April 24, 1955 has a wing measurement of 74 mm. and is assignable to the race *dominica*.

Catoptrophorus semipalmatus inornatus (Brewster), Western Willet.—Willets were noted on the sandy beach in front of the abandoned prison barracks at the southeast end of San Juanito Island on April 21, 1955. Several individuals of this species were also present on the tidal shelf rock on the southeast side of Maria Magdalena between April 23 and 26, 1955. In the Ed N. Harrison ornithological collection in Los Angeles there are two females labeled Tres Marias Islands, taken on November 29, 1926 by A. E. Colburn; other than these specimens, which were not recorded, there is no evidence of the species having been noted previously.

Heteroscelus incanus (Gmelin), Wandering Tattler.—A solitary tattler was col-

lected April 22, 1955 on San Juanito Island. No other individuals of this species were noted. Tattlers have not previously been recorded from the Tres Marias.

Crocethia alba (Pallas), Sanderling.—On April 21, 1955, several individuals of this species were observed feeding on the sandy beach in front of the abandoned prison barracks on San Juanito Island. A single specimen of this previously unrecorded species was taken from the above mentioned flock.

Larus heermanni Cassin, Heermann Gull.—Gulls of all species are uncommon on the Tres Marias group. Nelson (1899) refers to nesting evidence of this species on Maria Cleofas, but the record is not convincing. Numerous small fishing craft from the Nayarit coast put into the anchorage on the east side of Maria Cleofas and often have a small number of Heermann Gulls following in their wake. On April 26, 1957 a small fishing craft was noted several miles off Maria Cleofas with a small complement of gulls scavenging in its wake. The boat anchored overnight at Cleofas and departed the following morning. The Heermann Gulls that had arrived with it, remained behind upon its departure. After two days, however, the gulls had deserted the anchorage area and were not seen again. Although scarce on the Tres Marias, *Larus heermanni* is a very common nesting species on Isabel Island, lying midway between the Tres Marias and the Nayarit coast.

Columba flavirostris madrensis Nelson, Red-billed Pigeon.—These large pigeons were noted in considerable numbers on all of the islands with the exception of Maria Cleofas. On this latter island the species was not detected during our several days' stay, although a constant search was made for it. On Maria Magdalena large numbers of the pigeons were flushed from tree tops where they were feeding on a small guava-like fruit. They were also numerous about the small pools of the intermittent streams. The apparent lack of surface water on Maria Cleofas may account in part for the apparent absence of pigeons on that island.

Zenaidura macroura carolinensis (Linnaeus), Mourning Dove.—An intensive search on all of the islands other than Maria Madre failed to reveal any trace of this species of dove, and it is felt that it can be considered as of only accidental occurrence. The only record of *Zenaidura* for the Tres Marias is based upon the single specimen taken by Nelson and Goldman in 1897 on Maria Madre and subsequently described by Ridgway (1915) as *Zenaidura macroura tresmariae*. Aldrich and Duvall (MS), however, assign the specimen to the subspecies *carolinensis* after a critical study of the geographic races of the species and examination of the Ridgway type.

Zenaida asiatica mearnsi (Ridgway), White-winged Dove.—Although present in considerable numbers on all of the islands of the Tres Marias group, this dove is outnumbered by *Leptotila* and *Columbigallina*. *Zenaida* was least abundant on Maria Cleofas, but could always be found in the forest margin directly behind the beaches on the eastern side of that island.

Columbigallina passerina pallescens (Baird), Common Ground-dove.—An especially numerous species in the Tres Marias. On Maria Magdalena these minute doves were concentrated in the greatest number along the stream courses where small pools of water were still to be found in late April and early May. Even on Maria Cleofas, where no visible surface water was detected, the species was present in sizeable numbers.

Leptotila verreauxi capitalis Nelson, White-tipped Dove.—An examination of specimens of this extremely abundant species shows the race to be fairly well defined. When compared with specimens of *angelica* from Sinaloa on the mainland, the culmen and wing of *capitalis* prove to be slightly larger (culmen, 19.0 mm.; wing,

153.0 mm.). Ventrally, specimens of *capitalis* are paler on the breast as well as on the abdomen. In a large series of *angelica*, however, it is possible to find specimens which possess ventral plumage equally pallid as in *capitalis*.

This ground-haunting dove was collected on all of the islands except San Juanito. On this latter island, however, the vegetative growth is ideal for its needs and a subsequent search of the island should reveal its presence there.

Forpus cyanopygius insularis (Ridgway), Blue-rumped Parrotlet.—Although Grayson (1871) and Nelson (1899) reported parrotlets as common on both Maria Madre and Maria Magdalena, McClellan (1926) found them uncommon on Maria Madre and failed to observe any on Maria Magdalena. Willett (field notes) did not observe the species on Maria Magdalena and Maria Cleofas during his work on those islands in 1938. Although we searched diligently for it in 1955, we failed to find it on any of the four islands visited. These small parrotlets are easily overlooked unless one is familiar with their habits and call. Whether or not there is any significance in the fact that field workers have not noted the presence of this species on the Tres Marias since 1926, can only be determined by subsequent visits to the islands.

Amazona ochrocephala tresmariae Nelson, Yellow-headed Parrot.—During the course of our field work in 1955, the large Yellow-headed Parrots were noted as common on all of the four islands of the Tres Marias. They were most frequently noted in pairs during the day as they fed in the tops of fruit-bearing trees. On Maria Cleofas approximately twenty birds of this species were observed roosting in a heavy stand of the large agaves which grew on a point of land near the southeast anchorage. The flock would appear in the roosting area late each afternoon and after perching atop the tall flowering stems of the agaves for a short period, would then descend into the lower spiny leaves of the plants within five feet or less of the ground. Each morning at sun-up the birds would assemble as a flock and fly off to their feeding grounds on the forested slopes of the island. Although Grayson and Nelson both remarked on the tameness and approachability of these large parrots in 1871 and 1899, it was found that they have now become as wild as the parrots on the mainland.

The Tres Marias Yellow-headed Parrot is a well-defined race; all birds examined show the very extensive amount of yellow on the head and neck in contrast to the lesser amount exhibited by the mainland race. The light green of the back as well as the bluish-green wash of the breast is also evident when a series of *tresmariae* is compared with skins of *oratrix* from Colima. At the present time the range of *Amazona ochrocephala* on the west coast of the Mexican mainland extends only to the state of Colima and therefore does not reach Nayarit opposite the Tres Marias Islands. It is quite probable that this species had a greater northerly range at a much earlier time and extended to the Tres Marias prior to the islands being cut off from the mainland. With the formation of the island group as a result of the subsidence of a former peninsula which probably extended northwestward from the Jalisco coast just north of Banderas Bay, the peninsular population was isolated. In the Tres Marias, the species has maintained itself and evolved into the present recognizable race, while on the mainland it can be postulated that the range of the species has withdrawn to its present line in Colima.

Nyctidromus albicollis insularis Nelson, Tres Marias Pauraque.—Pauraques were only encountered by our party on Maria Magdalena, but subsequent search should reveal their presence on Maria Cleofas as terrain conditions on this latter island are similar to those of Maria Magdalena. The species is known to be abundant on

Maria Madre, as Grayson, Nelson, and McClellan all reported it from this island. On Maria Magdalena, Pauraques were most frequently encountered late in the afternoon or after darkness, but on several occasions individuals were collected as they fluttered along the shady stream courses during broad daylight. A comparison of specimens from the Tres Marias with those of the opposing mainland shows that the wing length of *insularis* averages greater (163 mm.) as does the length of the tail (161.0 mm.). Nelson (1898: 9) in his description of the insular race of *Nyctidromus*, remarks on the constancy of coloration of birds from the Tres Marias compared with the amount of variation demonstrated by birds from the mainland. In examining the series of Tres Marias birds at my disposal, I fail to find this statement to be correct, as the island birds also show a considerable amount of color variation ranging from grayish to slightly rufous. The only reliable characters appear to be the larger size of the wing and tail.

Cynanthus latirostris lawrencei (Berlepsch), Broad-billed Hummingbird.—A common species in the Tres Marias. Broad-billed Hummingbirds were observed by our party on all of the islands of the group with the exception of San Juanito. More intensive work on this latter island should, however, reveal its presence there as the plant cover appears to be adequate to its needs. The subspecies *lawrencei* is a well-defined race, being considerably larger than the mainland form. Dorsally it is suffused with coppery red compared to the bluish back of the race *latirostris* occurring in Nayarit. The throat of *lawrencei* is green rather than the blue of mainland birds.

Amazilia rutila graysoni Lawrence, Cinnamomeous Hummingbird.—As in the preceding species, this hummingbird is a common bird in the Tres Marias Islands and was observed by our party on all of the islands of the group with the exception of San Juanito. Specimens of the race *graysoni* are easily separated from birds of the mainland on the basis of their greater size.

Trogon elegans goldmani Nelson, Elegant Trogon.—Trogons have to date been reported from only Maria Madre and Maria Magdalena. A careful search was made for the species on Maria Cleofas but no individuals were found although Burt collected a female there on February 12, 1938. Vegetative conditions on San Juanito do not appear to be favorable for its presence on that island. On Maria Madre and Maria Magdalena, they are a fairly common species and are most frequently encountered in the more heavily forested portions of the islands.

Nelson in his description of the subspecies (1898: 8) states that the adult male birds are decidedly more greenish dorsally than male specimens from the mainland. In comparing a large series of skins from both areas, however, I fail to find any appreciable color differences in male birds; the skins from the islands exhibit just as much coppery sheen to the back as found in skins of *ambiguus*. The only discernible differences in *goldmani* appear to be the more ash-colored backs and paler rufous color of the middle rectrices in the females. There is no appreciable difference in measurements between mainland and island birds. Consequently I feel that *goldmani* is at best a poorly differentiated subspecies.

Dendrocopos scalaris graysoni (Baird), Ladder-backed Woodpecker.—A common species on all of the islands of the group. It is most frequently encountered in the thorny thickets of low shrubs, agaves, and terrestrial bromeliads just back of the beaches and is less common in the heavier forests. The low mat of vegetation covering San Juanito Island is especially well suited to the needs of this small woodpecker, and the species was found to be exceedingly common on this particular island.

Platypsaris aglaiae insularis Ridgway, Rose-throated Becard.—At the present time becards have been recorded from Maria Madre Island only and although a search was made for the species on Maria Magdalena and Maria Cleofas during our work there, no specimens were observed or collected. A more thorough search of these latter islands at a future date may show it to be present. The density of the vegetation on both islands is adequate for its needs and it may have just been overlooked.

Tyrannus melancholicus occidentalis Hartert and Goodson, Tropical Kingbird.—Flycatchers of this species have been previously recorded from all of the islands of the Tres Marias group with the exception of San Juanito. The species evidently moves back and forth between the islands and the mainland with little effort, as a lone individual came aboard the "Malibu" on April 20, 1955 as the ship was enroute between Maria Madre and Isabel Island.

Myiarchus tuberculifer tresmariae Nelson, Tres Marias Flycatcher.—These small flycatchers occur on all of the four islands and are the most obvious species of flycatcher in the island group insofar as numbers of individuals are concerned. The subspecies *tresmariae* is of doubtful validity as the differences between it and the mainland race, *olivascens*, are so slight as to be almost non-existent. There is no appreciable difference in coloration and the size differential is very slight. Unfortunately there are no large series of island birds available for a detailed study at the present time. When sufficient series are available in the future, it may be possible to determine the validity of this race.

Empidonax difficilis difficilis Baird, Western Flycatcher.—Grayson reported this flycatcher as common on Maria Madre, but Nelson found it sparingly on Maria Madre and Maria Magdalena. On February 9, 1938, Willett took two specimens on Maria Magdalena. A single specimen was taken by our party on Maria Cleofas on April 28, 1955 and no other individuals were noted. These three birds compare most closely with typical specimens of the race *difficilis*. Migrants of this species are apparently much more abundant in the islands during the winter months.

Elaenia viridicata minima Nelson, Greenish Elaenia.—Although recorded from Maria Madre and Maria Magdalena by both Grayson and Nelson, this small flycatcher was not noted by Willett in 1938, nor by our party in 1955. In his description of the race, Nelson (1898) mentions that a specimen taken by Grayson is typical of *jaliscensis*, showing that this latter race is also to be looked for in the islands as a straggler during the winter months.

Camptostoma imberbe Sclater, Beardless Flycatcher.—During the course of their work in the islands in 1897, Nelson and Goldman took two specimens of this species on Maria Madre and observed a few others. Willett failed to find it on Maria Magdalena or Maria Cleofas in 1938. During the course of our work in 1955 a single specimen was taken on San Juanito, but this individual was too badly damaged to permit subspecific determination. A solitary individual was observed on Maria Cleofas on May 27, 1955, but it was not collected. Consequently, it is impossible to state at this time whether the birds reaching the Tres Marias represent typical *imberbe* or *ridgwayi;* I have not had the opportunity of examining the two specimens taken by Nelson.

Thryothorus felix lawrencii Ridgway, Lawrence's Wren.—Wrens of this species are relatively abundant on all of the islands of the Tres Marias group with the exception of San Juanito. This latter island lacks the shaded canyons and heavy vegetation characteristic of the other three islands and hence does not seem to meet the habitat requirements of *Thryothorus*. Nelson (1899) remarks on the

extreme tameness of *Thryothorus* on Maria Magdalena and describes the incident in which Goldman was actually able to capture a wren as it foraged on the ground near him. On one occasion during our stay on Magdalena, while "squeaking" for birds along a wooded stream course, I was able to decoy a wren within one foot of my face. No attempt was made to capture this individual, however.

The subspecies *lawrencii* is a well-defined pallid race named by Ridgway (1878) from Maria Madre Island and is easily separated from *Thryothorus f. pallidus* of the opposing mainland by the lesser amount of streaking on the side of the head and the decidedly more pallid coloring of back and ventral areas.

Nelson (1898), after a study of *T. felix* from adjacent Maria Magdalena, described the race *magdalenae* and stated that birds from this island although identical in size to *T. f. lawrencii* of Maria Madre, were darker in coloration. At the time of Nelson's study the species had not been taken on Maria Cleofas to the south. Willett, in 1938, took a single specimen on Maria Cleofas and our party in 1955 succeeded in taking three additional specimens on this same island. Comparison of this material, and specimens obtained on Maria Magdalena in 1955, with *T. f. lawrencii* from Maria Madre indicates that the birds of all three islands are inseparable as to race and that *magdalenae* should be considered a synonym of *lawrencii;* with but one well-defined subspecies occupying the three islands. Measurements of *lawrencii* from Maria Cleofas are as follows: 1 ♂ wing 62.0 mm., tail 55.0 mm., culmen 7.5 mm. Average of 3 ♀ ♀ wing 55.3 mm. (54–56.2 mm.); tail 54.2 mm. (52–58 mm.); culmen 5.7 mm. (5.0–6.0 mm.).

Melanotis caerulescens longirostris Nelson, Blue Mockingbird.—Blue Mockingbirds are common on the three larger islands but have not as yet been recorded from San Juanito. The species was noted as exceedingly common in the heavy forests of Maria Cleofas during our investigations there in the latter part of April, 1955. While "squeaking" for birds in the heavy forests of Cleofas, it was not unusual to have as many as six or eight individuals scolding within ten feet of me at one time. An examination of a series of island mockingbirds, shows *longirostris* to be a recognizable race with wing and tail definitely shorter than the opposing mainland form. The bill is longer than in *effuticius*. Insular birds are somewhat paler than mainland specimens, but this latter character is not well marked.

Turdus rufo-palliatus graysoni (Ridgway), Tres Marias Robin.—An exceedingly abundant species on all of the islands except San Juanito. Further search on this latter island may also reveal the presence of robins there as terrain and vegetation appear to be suited to its needs. On Maria Magdalena during April 1955, flocks numbering 150 to 200 birds were frequently encountered in the forested canyons. The subspecies *graysoni* is a well-defined pallid race with a large bill and requires no detailed taxonomic comment at this time.

Myadestes obscurus insularis Stejneger, Tres Marias Solitaire.—Grayson and Nelson both found the solitaire to be common at the higher elevations on Maria Madre and Maria Magdalena. Neither Willett in 1938, nor our party in 1955, had the opportunity of working along the crests of the islands and consequently none of us encountered the species during our respective visits. Although not recorded from Maria Cleofas to date, it is quite possible that the species will be found on this island when a more thorough investigation is made of the island at a future date.

Vireo hypochryseus sordidus Nelson, Golden Vireo.—Although not previously recorded from Maria Cleofas, this small yellow vireo was found occurring there in relative abundance during the course of our investigations in April, 1955. Grayson

and Nelson reported it from Maria Madre and Maria Magdalena and our party found it abundant on this latter island. The species has not yet been found on San Juanito, however. The race *sordidus* is readily distinguished from mainland birds by its definitely duller yellowish-green coloration.

Vireo olivaceus forreri (Madarasz), Forrer's Red-eyed Vireo.—Red-eyed vireos are one of the commonest avian species in the Tres Marias and it is interesting that Grayson failed to record it during any of his visits to the islands. Nelson found it to be abundant in 1897 and it was noted as common by our party in 1955 on Madre, Magdalena, and Cleofas. It was not observed, however, during our two days' investigation on San Juanito. The question as to whether or not this vireo is migratory is yet to be answered. Willett and Burt apparently did not find it on Magdalena or Cleofas in February 1938, as there are no specimens of this species in the material collected by them. Whether the species was merely missed by them or was actually absent from the islands is unknown. Subsequent field work during the winter months should, however, solve this riddle. Comparison of *forreri* with *hypoleucus* of the mainland shows the island form to be a well-defined race with greater size and almost non-existent superciliary streak.

Parula pitiayumi insularis (Lawrence), Tres Marias Parula Warbler.—If not the most abundant land bird in the Tres Marias, the Parula Warbler is at least the most obvious species, and is encountered on all of the four islands. There appears to be considerable movement by this species between the island group and the adjacent mainland of Nayarit. In the R. T. Moore collection at Occidental College there are six skins from San Blas taken by Chester C. Lamb in March of 1948; four of these are labeled *pulchra* × *insularis* and two appear to be typical *insularis*. The presence of a second insular race, *P. p. graysoni*, far to the westward on Socorro Island of the Revilla Gigedos, indicates that the species has the tendency for island occupation by over-water flight; Socorro is a purely volcanic oceanic island with no previous land bridge.

Seiurus aurocapillus cinereus Miller, Gray Oven-bird.—The Oven-bird has previously been recorded from the Tres Marias by McClellan (1926) who collected a single specimen May 16, 1925 on Maria Madre. A second specimen for the islands was taken by me on Maria Cleofas, May 1, 1955. Miller (1942) in his study of the Oven-birds of the Rocky Mountain area, examined the Maria Madre specimen and assigned it to his western race *cinereus*. In comparing the Maria Cleofas specimen with a large series of typical *aurocapillus* from the eastern United States, I find that it agrees with Miller's description of the western form in color. The back, rump, and rectrices are grayer and paler and not as green as in typical *aurocapillus*. The Maria Cleofas specimen, an adult male, is in fresh spring plumage and shows practically no wear. Measurements are almost identical to those listed for the type of *cinereus* and are as follows: Wing 72.5 mm., tail 49.2 mm., bill from nostril 8.6 mm. and tarsus 21.2 mm. Testes measured 2 mm. The Cleofas bird was collected as it foraged at the base of a deciduous tree in a shallow arroyo just back of the beach on the southeast side of the island.

Granatellus venustus francescae Baird, Red-breasted Chat.—This beautiful and well-defined subspecies occurs sparingly in the Tres Marias. Grayson, Nelson, and McClellan all recorded it from Maria Madre. Burt collected a male on Maria Magdalena on February 9, 1938, but he and Willett failed to find it on Cleofas. On April 24, 1955 I secured an adult pair in a heavily wooded canyon on the southeast slopes of Maria Magdalena, and on April 29, 1955 a female was taken on Maria Cleofas. Both Grayson and Nelson comment on the terrestrial activities of this

species and state that it is seldom arboreal in its foragings for food. It is therefore of interest to note that on both occasions when the species was seen in 1955, the birds were not on the ground, but were found feeding among the branches of forest trees, approximately ten feet above the ground. The scattered black feathers of the pectoral collar of *francescae* readily distinguish the island race from the mainland form which possesses a well-defined black collar on the chest.

Molothrus ater obscurus (Gmelin), Dwarf Cowbird.—The cowbird has not been previously recorded from the Tres Marias. Consequently it was of interest to note the presence of one individual of this species on San Juanito in 1955. This specimen, an adult male, was collected April 21, 1955 by Mrs. Maurice A. Machris. The cowbird's occurrence was obviously accidental as no other individuals were observed. The specimen is assigned to the race *obscurus* because of its small size. It compares favorably with a large series of skins of this small race in the collection of the Los Angeles Museum. Measurements are as follows: wing 100.2 mm., tail 67.0 mm., exposed culmen 15.1 mm., and tarsus 10.9 mm.

Icterus pustulatus graysonii Cassin, Streak-backed Oriole.—An abundant species on all four islands of the group. Although not previously reported from San Juanito, it was found to be exceedingly common on this particular island during our visit there on April 21 and 22, 1955. Because of its large size and brilliant plumage, this well-defined subspecies forms a dominant item of the avifauna of these islands. The almost complete lack of dorsal black streaking and the prominent yellow cast of the throat and chest, rather than the red of the mainland form *microstictus*, immediately separate this insular form from the other members of the polytypic species.

Piranga bidentata flammea Ridgway, Flame-colored Tanager.—Tanagers of this species are relatively abundant in the Tres Marias and are easily noted by their brilliant, red-orange plumage. The species has been previously recorded from Maria Madre and Maria Magdalena by Grayson and Nelson, and our party found it fairly common on Maria Cleofas in 1955. The dorsal color of *flammea* appears darker than in specimens of *bidentata* from the mainland. There is also a lesser amount of greenish-yellow in the back color of *flammea*. The restricted size of the white spots in the rectrices compared to those of *bidentata* also holds fairly well as a diagnostic character for *flammea*. Measurements of three adult males from Maria Magdalena are as follows: wing 97.5; 98; 98.5; tail 78; 81; 83; culmen 17.6; 17.6 and 18.0.

Richmondena cardinalis mariae Nelson, Tres Marias Cardinal.—The Cardinal is an abundant species in the Tres Marias and is an obvious member of the island avifauna because of its brilliant coloration and unsuspecting nature. It is plentiful on all of the four islands and was noted in numbers on San Juanito. An examination of a series of skins from all four islands shows that the race *mariae* differs from *igneus* of Baja California in that the dorsal coloring of males is a richer red with less grayish tipping to the feathers. Ventrally, males of *mariae* are somewhat more red than males of *igneus*. The bill is more swollen and the tarsus is considerably longer and heavier. In his description of the race *mariae*, Nelson (1898: 10) states that the females of *mariae* are very distinct from females of *igneus* in that the former have a large, whitish throat area and the entire abdomen is whitish which results in a broad pectoral band of buff. An examination of a series of four females of *mariae* fails to substantiate this character. Male cardinals from the Tres Marias are more orange-red than males of *sinaloensis* from Jalisco. In this series the throats of the females are white but the abdomens are buff.

Passerina ciris pallidior Mearns, Painted Bunting.—Painted Buntings have not previously been recorded from the Tres Marias Islands, so it was of considerable interest that the species was encountered on Maria Magdalena Island on April 26, 1955. On this occasion I collected a solitary female as it came to water at a small pool in a stream bed on the southeast side of the island. No other individuals of this species were observed during our stay in the islands. The above-mentioned specimen is tentatively assigned to the western race *pallidior* on the basis of its decidedly dull gray-green coloration. Measurements of the specimen are as follows: wing 64.0 mm., tail 49.0 mm., culmen from base 10.5 mm.

Spinus psaltria psaltria (Say), Dark-backed Goldfinch.—These small goldfinches occur abundantly on Maria Madre and Maria Magdalena, and sparingly on Maria Cleofas. The species has not been previously recorded from Maria Cleofas, but there is an adult male in the collection of the Los Angeles County Museum taken by George Willett from this latter island on February 12, 1938. The species was not observed on San Juanito. Adult males from the islands all show uniform jet black backs except for the normal white patterned wings.

CHECK-LIST OF BIRDS OF TRES MARIAS ISLANDS

A careful tabulation of all species recorded by previous ornithologists and information resulting from our own recent work within the island group is given here as an aid to those workers who may visit the Tres Marias in the future. Several species that are not considered as validly recorded have been omitted from the list until their presence within the islands can be definitely verified. Species dropped are: *Speotyto cunicularia*, *Micrathene whitneyi*, *Corvus ossifragus*, *Cissilopha beecheii*, and *Hirundo rustica*. Species listed as accidental are records of but one indivudual specimen. Species for which there are several records, but not enough to consider them as resident, are listed as casual. The islands are listed numerically as follows: 1 (Maria Madre), 2 (Maria Magdalena), 3 (Maria Cleofas), and 4 (San Juanito).

Phaëthon aethereus mesonauta	Breeding	1, 2, 3, 4
Pelecanus occidentalis californicus	Breeding	1, 2, 4
Sula nebouxii	Breeding	3, 4
Sula leucogaster nesiotes	Breeding	3, 4
Fregata magnificens rothschildi	Breeding	2, 3, 4
Ardea herodias ssp.	Casual	1, 2, 4
Casmerodius albus egretta	Accidental	1
Leucophoyx thula thula	Accidental	1
Nyctanassa violacea bancrofti	Casual	1
Plegadis falcinellus mexicana	Casual	1
Coragyps atratus	Casual, possibly breeding	1
Cathartes aura teter	Breeding	1, 2, 3, 4
Chondrohierax uncinatus uncinatus	Accidental	2
Buteo jamaicensis fumosus	Breeding	1, 2, 3
Pandion haliaëtus carolinensis	Breeding	1, 2, 3, 4

Caracara cheriway pallidus	Breeding	1, 2, 3, 4
Falco peregrinus anatum	Accidental	1
Falco albigularis ssp.	Accidental	1
Falco sparverius ssp.	Accidental	1
Lophortyx douglasii ssp.	Breeding	1
Fulica americana americana	Casual	1
Haematopus ostralegus frazari	Breeding	1, 2, 3, 4
Pluvialis dominica dominica	Casual	2
Charadrius hiaticula semipalmatus	Accidental	1
Charadrius vociferus vociferus	Accidental	1
Numenius phaeopus hudsonicus	Casual	2, 4,
Numenius americanus ssp.	Accidental	1
Tringa flavipes	Accidental	1
Actitis macularia	Casual	1, 2, 3, 4
Catoptrophorus semipalmatus inornatus	Casual	2, 4
Heteroscelus incanus	Accidental	4
Crocethia alba	Accidental	4
Erolia melanotos	Casual	1, 2, 4
Himantopus mexicanus	Accidental	1
Larus heermanni	Casual, possibly breeding	1, 2, 3
Larus argentatus smithsonianus	Accidental	4
Thalasseus maximus maximus	Accidental	3
Columba flavirostris madrensis	Breeding	1, 2, 3
Zenaidura macroura carolinensis	Accidental	1
Zenaida asiatica mearnsi	Breeding	1, 2, 3, 4
Columbigallina passerina pallescens	Breeding	1, 2, 4
Leptotila verreauxi capitalis	Breeding	1, 2, 3
Forpus cyanopygius insularis	Breeding	1, 2
Amazona ochrocephala tresmariae	Breeding	1, 2, 3, 4
Coccyzus minor palloris	Casual	1
Tyto alba praticola	Accidental (heard calling)	1
Chordeiles acutipennis texensis	Casual	1
Nyctidromus albicollis insularis	Breeding	1, 2
Cynanthus latirostris lawrencei	Breeding	1, 2, 3
Amazilia rutila graysoni	Breeding	1, 2, 3
Trogon elegans goldmani	Breeding	1, 2, 3
Ceryle alcyon caurina	Accidental	1
Dendrocopos scalaris graysoni	Breeding	1, 2, 3, 4
Platypsaris aglaiae insularis	Breeding	1
Tyrannus melancholicus occidentalis	Breeding	1, 2, 3
Myiarchus tyrannulus magister	Breeding	1, 2, 3
Myiarchus tuberculifer tresmariae	Breeding	1, 2, 3
Contopus richardsonii	Casual	1
Empidonax difficilis difficilis	Casual	1, 2, 3
Elaenia viridicata minima	Breeding	1, 2
Elaenia viridicata jaliscensis	Accidental	1
Comptostoma imberbe imberbe	Casual	1, 3, 4
Thryothorus felix lawrencii	Breeding	1, 2, 3

Melanotis caerulescens longirostris	Breeding	1, 2, 3
Mimus polyglottos leucopterus	Breeding	1, 2
Turdus rufo-palliatus graysoni	Breeding	1, 2, 3
Myadestes obscurus insularis	Breeding	1, 2
Hylocichla ustulata ustulata	Casual	1, 2
Hylocichla ustulata swainsoni	Casual	1, 2
Vireo hypochryseus sordidus	Breeding	1, 2, 3
Vireo olivaceus forreri	Breeding	1, 2, 3
Parula pitiayumi insularis	Breeding	1, 2, 3, 4
Dendroica petechia morcomi	Accidental	1
Dendroica petechia rubiginosa	Accidental	1
Dendroica auduboni auduboni	Accidental	1, 3, 4
Dendroica townsendi	Accidental	1
Seiurus aurocapillus cinereus	Accidental	1, 3
Granatellus venustus francescae	Breeding	1, 2, 3
Wilsonia pusilla chryseola	Accidental	1
Molothrus ater obscurus	Accidental	4
Cassidix mexicanus graysoni	Accidental	1
Icterus pustulatus graysonii	Breeding	1, 2, 3, 4
Piranga ludoviciana	Accidental	1
Piranga bidentata flammea	Breeding	1, 2, 3
Richmondena cardinalis mariae	Breeding	1, 2, 3, 4
Passerina ciris pallidior	Accidental	2
Carpodacus cassinii	Accidental	1
Spinus psaltria psaltria	Breeding	1, 2, 3

Discussion and Conclusions

A comparison of the early avifauna of the islands, as observed in 1865–1867 and 1897 by Grayson and Nelson, with that of the present as noted by our party in 1955, indicates that there has been little or no disturbance of the many resident genera of the island group. The only bird of questionable status is *Forpus cyanopygius*, which has not been reported from any of the islands except Maria Madre since 1899. As stated previously, however, this may be an oversight upon the part of ornithologists visiting the islands subsequent to Nelson's work. The stable condition of the bird life of the Tres Marias is in marked contrast to its appalling decline on Guadalupe Island to the north, as shown by Howell and Cade (1954). There is a disturbing indication, however, that the continued occupation and use of Maria Madre will alter the avifaunal and botanical picture of this large island. Also the introduction of deer and domestic goats upon Maria Magdalena presents a potential threat to this island although the dense concentration of plant growth covering the island so far shows no appreciable change.

The absence on the islands of certain genera of the opposing mainland is of interest and as yet cannot be satisfactorily explained.

Ecologic conditions appear to be favorable for *Calocitta*, *Cissilopha*, *Piaya*, *Momotus*, *Aratinga*, and *Pipilo*, yet these genera are totally absent from the island group. The presence of *Pipilo* and *Aratinga* on outlying Socorro Island indicates that these genera were capable of negotiating a vast expanse of water at a very early date.

The presence of a race of *Amazona ochracephala* in the Tres Marias presents an interesting problem in avian distribution, as Yellow-headed Parrots today do not range northward on the opposing mainland coast beyond the latitude of the state of Colima. It is postulated here that the species may have had a more northerly distribution on the mainland at a much earlier period in geologic time, and possibly occupied the Tres Marias when the present islands were still a part of a probable peninsula extending northwesterly from the vicinity of Banderas Bay in the state of Jalisco.

Our investigations in 1955 have added seven additional forms to the previously known avifauna, as follows: *Chondrohierax u. uncinatus*, *Lophortyx douglasii*, *Pluvialis d. dominica*, *Catoptrophorus semipalmatus inornatus*, *Heteroscelus incanus*, *Crocethia alba*, *Molothrus ater obscurus* and *Passerina ciris pallidior*. Two previously named insular races are placed in synonymy as a result of this study. These are: *Zenaidura macroura tresmariae* (= *Z. m. carolinensis*) and *Thryothorus felix magdalenae* (= *T. felix lawrencii*).

Considerable information is yet needed relative to ecologic and life history problems of the birds of the Tres Marias. Especial attention is also needed with regard to the botany of the Tres Marias as this subject has been sadly neglected. It is hoped that the work of future biologists visiting these islands will fill the many gaps still apparent in our knowledge.

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LITERATURE CITED

GRAYSON, A. J. 1871. The physical geography and natural history of the islands of the Tres Marias. Proc. Bost. Nat. Hist. Soc., **14**: 261–302.

HANNA, G. D. 1926. Expedition to the Revillagigedo Islands, Mexico in 1925. General Report. Proc. Calif. Acad. Sci., **15**: 1–113.

HOWELL, T. R., and T. J. CADE. 1954. The birds of Guadalupe Island in 1953. Condor, **56**: 283–294.

MCCLELLAN, M. E. 1926. Expedition to the Revillagigedo Islands, Mexico, in 1925. VI. The birds and mammals, Proc. Calif. Acad. Sci., **15**: 279–322.

MILLER, A. H. 1942. Differentiation of the Ovenbirds of the Rocky Mountain region. Condor, **44**: 185–186.

NELSON, E. W. 1898. Descriptions of new birds from the Tres Marias Islands, western Mexico. Proc. Biol. Soc. Wash., **12**: 5–11.

NELSON, E. W. 1899. Birds of the Tres Marias Islands. N. Amer. Fauna **14**: U. S. Dept. Agric., pp. 7–62.

RIDGWAY, R. 1878. Description of a new wren from the Tres Marias Islands, Mexico. Bull. Nutt. Ornith. Club, **3**: 10.

RIDGWAY, R. 1915. Descriptions of some new forms of American cuckoos, parrots, and pigeons. Proc. Biol. Soc. Wash., **28**: 105–107.

SALVIN, O., and F. DUC. GODMAN. 1879–1904. Biologia Centrali-Americana, Aves I, II, III, and IV.

Los Angeles County Museum, Exposition Park, Los Angeles, California, June 28, 1957.

NOTES ON THE COURTSHIP BEHAVIOR OF THE KING RAIL

BY BROOKE MEANLEY

THE KING RAIL (*Rallus elegans*) has been well known to collectors, hunters, and bird watchers ever since its discovery by Audubon in the early 1800's but few detailed behavior studies have been made of this species.

The present paper, the third in a series based on observations in the rice fields of eastern Arkansas (Meanley, 1953 and 1956), presents information concerning the courtship behavior of this rail.

I made observations mostly during the months of February, March, and April, 1954 and 1955. At this season of the year King Rails in the rice belt are found chiefly in roadside ditches and in rice field canals, but in the course of feeding and courtship activity they sometimes wander into partially inundated rice stubbles, pastures, and fallow fields bordering such ditches and canals.

Many of the data were obtained by observing rails with 7 × 35 binoculars from an automobile parked along roadside ditches. In many cases the rail under observation wandered so close to the car (5 to 10 feet) that binoculars could not be focused. The greater part of the field work was done from dawn until about 9:00 A.M. and in the evening from 4:00 P.M. until dusk.

Using an automobile as a mobile blind made it possible to follow courting rails for long periods of time along a roadside ditch. On many occasions a pair of rails was kept under constant observation for two hours or longer. Four males provided data on pre-nuptial courtship while 20 pairs provided data during the nuptial courtship.

Sexes were distinguished in the field by continuous observation of individuals until the performance of some unquestionably distinguishing act; i.e., either copulation or attempted copulation; or during the earlier stages of courtship, by the behavior of the birds toward each other; as males obviously claiming territories responded to other males belligerently, while females were permitted to enter a territory unchallenged, at the same time evoking displays of white outer tail coverts, posturings, etc. One individual was so unusually small as to be recognizable. When this individual was determined to be a female, all previous and subsequent records could be easily specified.

The number of territories occupied by resident males in a given area was determined by recording the mating call of rails along a six-mile stretch of roadside ditch north of Stuttgart, Arkansas. Later in the season, nests were found on most of these territories.

TERRITORIES AND POPULATION DENSITY

During the breeding season territories occupied by King Rails in roadside ditches consisted of small strips of fresh-water marsh. The predominant plants in most of these small marsh strips (in order of relative abundance and consequently also of importance as nesting cover for the King Rail) were: *Juncus effusus*, *Carex stipata* (?), *Carex hylanopelis*, *Rhynchospora* sp., undetermined Gramineae, *Typha latifolia*, *Eleocharis palustris* (?), and *Polygonum* sp. Subdominants included several species of *Sagittaria* and Gramineae.

The schedule of arrival of males in the area and the stage of courtship determined the size and choice of territory. It is conceivable that the earlier arrivals manage to claim larger and more suitable territories than those which arrive later when competition is keener. However, territorial boundaries were rather fluid during the earlier part of the courtship and pairing period. As additional males moved into an area of suitable roadside ditch habitat, the large courtship-and-feeding territories of the first contingent tended to shrink.

During the last week in February and the first week in March, one male King Rail gave the mating call at various points along 975 feet of roadside ditch. By the second week in March its mating calls were heard from about 500 feet of roadside ditch; its territory was then about half its original size. The diminishing territory was caused by (a) pressure from another courting male, (b) burning of cover along part of a ditch bank within the original calling territory, and (c) relatively modest territorial requirements for nesting, particularly if there is plenty of water in the area about the nest where the rail can find ample aquatic animal life for food.

An idea of the size of nesting territories was determined by measuring the distances between 3 nests in the same ditch: from the nest in the center there was a distance of 298 feet to the nest on one side and 166 feet to that on the other. The ditch was about 30 feet wide at all three points.

There were 22 occupied nesting territories along 6 miles of continuous roadside ditch.

Defense of Territories.—King Rails defended their territories both inter- and intra-specifically. When another King Rail invaded a territory, the possessor often prepared to charge by coming to a "freeze," assuming a partial crouch, drawing in its neck, and slowly ruffling its feathers. Then it chased the intruder on foot and wing.

As additional King Rails moved into suitable nesting habitat, there was much fighting, particularly near boundaries of the more

desirable territories. I observed a typical skirmish in a narrow ditch bordering a secondary road, on April 21, 1955. At this unstable territory boundary, two males attacked each other, sparring like fighting cocks for about 20 seconds. Then the bout suddenly ended, and the birds moved in opposite directions.

On April 22 in a rice stubble which appeared to be a common feeding ground for the occupants of the adjacent section of roadside ditch, two males (each already paired) "squared off" in a bitter encounter that was timed at 3 minutes. There was much chasing, both on foot and on wing, and considerable clashing in "fighting cock style." W. E. D. Scott (Bent, 1926: 287–288) reported similar fighting by Clapper Rails (*Rallus longirostris scotti*) during the courtship period; according to Scott, "During the mating season the male birds are very pugnacious and resent any intrusions from others of the species. At such times I have seen them have pitched battles, and finally, one giving in and taking to flight, the victor would pursue the vanquished on the wing for several hundred feet."

Sora Rails (*Porzana carolina*) migrating through the Arkansas rice country in spring frequent roadside ditches occupied by King Rails on established nesting territories. One King Rail made 4 passes in running flight at a Sora in order to evict it. Virginia Rails (*Rallus limicola*) received the same treatment.

PRENUPTIAL COURTSHIP

The Mating Call.—During the first warm days of late February, the mating call of a King Rail was heard for the first time in the roadside ditches adjacent to rice stubbles or other fields. Rails fed in the shallow water of the ditch and used the grasses (often *Andropogon* spp.) on the ditch bank, or the outside levee of an old rice field, as a place of retreat or hiding. Moreover, the rails used little lanes or pathways, such as those made by a cottontail rabbit, for travelling in concealment along the ditch banks. In late February almost the only vegetation that offered concealment to the calling King Rail was the perennial *Andropogon* of the ditch bank; consequently, much of the early season calling emanated from behind or from among clumps of this grass. However, where there happened to be an old growth of cattails in the ditch, the rail called from this cover.

The male King Rail called its mate from concealed, partly concealed, and completely exposed positions. The purpose of this call presumably was first to attract a mate and later, after pair formation, to rally her.

The mating call is one of the least difficult calls of the King Rail to describe. It was most commonly given as a harsh *kik-kik-kik-kik-kik*. Occasionally it varied from a series of *kiks* to a series of *kuks*. The pitch of the call was steady, but the tempo increased from time to time. One bird under observation was heard to give the call continuously for 18 minutes.

I never heard the female give the mating call.

Other Calls.—Perhaps the most characteristic call of the King Rail, one that was heard throughout the breeding season, may be written as *jupe-jupe-jupe-jupe-jupe* or *cheup-cheup-cheup-cheup-cheup* or sometimes *gelp-gelp-gelp-gelp-gelp*. The first several notes were louder and higher in pitch than the succeeding notes. The tempo increased rapidly toward the end of the call, and the notes ran together. One rail gave 25 distinct *jupes* in a single series, not including those in the rapid ending, which could not be counted. This was a very loud call that carried a greater distance than the mating call. It was sometimes answered by a number of other King Rails, it was sometimes used when a bird was startled, and occasionally it served as an "all is well" call when a pair of separated birds were reunited; moreover, an incubating bird occasionally used the call when it wished to be relieved at the nest. Apparently the call served still other purposes.

A call that was heard sometimes during prenuptial courtship, but more frequently after pairing, was a soft and rapid *tuk-tuk-tuk-tuk-tuk*. Both the male and female uttered this sound, which reminded me somewhat of the clapping together of the mandibles of the Barred Owl (*Strix varia*). The call was seldom audible to the human ear beyond 20 or 30 feet. The King Rail used the "tuk" call as a rallying call or gave it to indicate its position to its mate.

Display.—The display of the male King Rail, as witnessed, was certainly not spectacular. Females observed during prenuptial courtship made no attempt to display.

The display of the male during this period was relatively simple and consisted mostly of walking about, tail uplifted and white under-tail coverts extended (see Figure 1, 1). Some males cocked their tails vertically, in a position which afforded a view of the white under-tail coverts from a considerable distance. While flashing its white under-tail coverts, the rail usually flicked its tail back and forth slightly.

There were other forms of posturing during the period of courtship and mating, but evidently the cocked tail and well-exposed white under-tail coverts (and the mating call) were the principal means of attracting a mate.

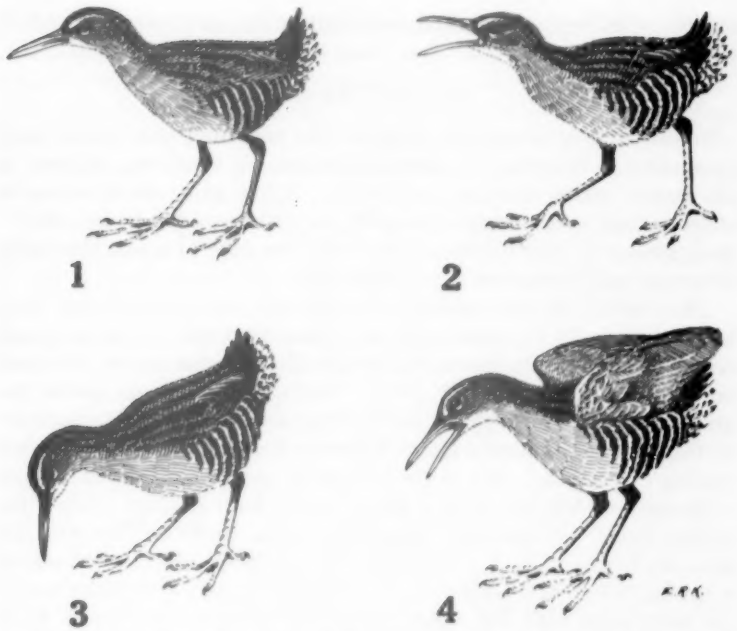

FIGURE 1. Displays of the King Rail. (1) Earliest form of display, and most frequent (Tail cocked and white under-tail coverts extended). (2) Pursuit Display (Male pursuing female during pre-nuptial courtship. Bird walking fast or running; with tail slightly cocked, white under-tail coverts extended; and bill wide open). (3) Invitional Display (Posture assumed by mated male upon close approach of female. Bill pointing downward and slowly swinging from side to side. Tail displayed). (4) Variation of Invitional Display (Wings arched; head turned to one side, bill open. Tail displayed).

I have on two occasions observed what appears to be another form of display, termed the "pursuit display" in this paper. The circumstances and the behavior of the male were essentially the same both times. Both males had been under observation almost since they had started sounding the mating call. In each case the male was one that apparently had not succeeded in attracting a mate to its territory. On March 1, 1955, at 8:30 A.M., I saw a small and very rufescent King Rail, later established to be a female, approaching a calling male along a rice levee bordering a roadside ditch. The female continued along the water's edge at a slow but steady gait and passed beyond the male that was standing in the ditch. As soon as she was ahead of him, the male followed her in a fast walk with head and neck outstretched, bill open (but emitting no sound

audible at 40 feet), tail cocked, and white under-tail coverts extended (see Figure 1, 2).

NUPTIAL COURTSHIP

Following pair formation much of the posturing and calling that characterized the period of prenuptial courtship continued, at least in the earlier phases of nuptial courtship. While pair formation was in progress, but infrequently during the nuptial courtship period, the female uttered a *purr* or *churr* sound, like the *purr* of a cat, especially after the male had given the mating call.

The male used the mating call (*kik-kik*) infrequently and with less vigor to rally the newly won mate that often strayed as it foraged. A good example of the use of this call shortly after pairing was observed on the evening of March 2, 1955. During an 18-minute period beginning at 5:30 P.M. a paired male, while standing partially concealed in the same position on a rice field border levee, uttered the complete mating call 7 times. Six of the 7 times its mate ran to the male from a distance of 100 feet or less where it had been feeding. When the female came up, the male spread its white under-tail coverts and bent its head and neck so that the bill was perpendicular and nearly touching the ground (Figure 1, 3). From this position it often turned its bent head with bill open toward the female. At one of these meetings it appeared to be about to mount the female and began to rise up with its bill still wide open; but the female evidently had not reached physiological readiness, and copulation did not occur.

Many times later other males assumed the posture just described, but most often they were standing in water, in which case the bill usually touched or slightly dipped into the water. The birds assumed the pose after pairing, when the feeding female that had been at some distance from the male came within 3 or 4 feet of her mate. On one occasion a male under such circumstances arched its partly opened wings (Figure 1, 4).

When feeding with a female during the courtship period, the male usually led the way and during the earlier part of this period continued to cock its tail and extend its white under-tail coverts. The mated pair seemed very devoted. During a two-hour period when mated birds were under constant observation, the male caught 7 crayfish (*Cambarus* sp.), 5 of which he presented to the female. I frequently observed the mated pair standing close together, gently nibbling at one another.

As the nesting period approached, the mating call and flashing of under-tail coverts by the male all but ceased, and a number of addi-

tional calls, mostly soft or subdued, increased the repertoire of the mated pair. Paired rails used such calls as a rallying device when separated and as a reassuring answer to one another when together.

A call frequently given by both birds, particularly as nesting approached, was a very soft *poyeek-poyeek-poyeek-poyeek-poyeek*, or *wyeek-wyeek-wyeek-wyeek-wyeek*, which seemed to be an inquiry as to the whereabouts of the mate.

Several males gave what seemed to me to be one of the most unusual calls uttered by a rail. It was a deep, booming sound requiring an effort that caused the body to appear to expand slightly. I have attempted to record this sound as *óom-óom-óom-óom-óom*. The purpose of the "booming" call is not known. It is not very loud, and the female was not nearby when it was uttered unless she was well concealed.

Comparison with the Courtship Calls of the Clapper Rail

During the spring of 1956 I had an opportunity to see and hear courting Louisiana Clapper Rails (*Rallus longirostris saturatus*) in the marshes just south of Grand Chenier, Cameron Parish, Louisiana. It is extremely interesting to observe the similarity in appearance and habits of the King and Clapper rails in this area. Where the fresh-water and brackish marshes meet, these species sometimes nest only a few yards apart. Lowery (1955: 227) refers to them as "ecological representatives of each other."

After listening to the calls of many Kings and Clappers in the Cameron Parish marshes, I concluded that their mating call (*kik-kik-kik*) was identical, as was the *jupe-jupe-jupe* (or *cheup-cheup-cheup* or *gelp-gelp-gelp*) call described above.

On one occasion when a mated pair of Clappers was feeding some 50 yards apart, the male stopped feeding, stood erect, and gave the mating call; the female immediately ran to him in the same manner as a responding female King Rail that I saw at Stuttgart, Arkansas.

Further investigation of the habits of these two closely related species would possibly reveal many other identical behaviorisms.

Summary

I observed the courtship behavior of the King Rail at Stuttgart, Arkansas, during the spring of 1954 and 1955.

The mating call and the exposure of the white under-tail coverts were the principal means used by the male King Rail to attract a mate. During the nuptial phase of courtship several rather subdued

calls were given by the mated pair and the mating call was given less often. Posturing was more varied after mating.

The mating call and several other calls uttered by the King Rail during the courtship period sounded identical to those given by the Louisiana Clapper Rail at Grand Chenier, Louisiana.

I am especially indebted to Frank L. Hoskins and E. R. Kalmbach for reviewing the manuscript, and to Dr. Kalmbach for making drawings of the several King Rail displays which were roughly sketched in the course of gathering field data. Grateful acknowledgment is also made to Anna G. Meanley for assistance in the field work and to Alexander C. Martin and Neil Hotchkiss of the Fish and Wildlife Service for the identification of several plants mentioned in this paper.

LITERATURE CITED

AUDUBON, J. J. 1835. Ornithological Biography. Edinburg, Adam and Charles Black, Vol. III, 631 pp.

BENT, A. C. 1926. Life histories of North American marsh birds. U. S. Natl. Mus. Bull. 135: 1–490.

LOWERY, G. H., JR. 1955. Louisiana Birds. Baton Rouge, Louisiana State Univ. Press, 556 pp.

MEANLEY, B. 1953. Nesting of the King Rail in the Arkansas rice fields. Auk, **70**: 261–269.

MEANLEY, B. 1956. Food habits of the King Rail in the Arkansas rice fields. Auk, **73**: 252–258.

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THE BEARD OF THE WILD TURKEY

BY A. W. SCHORGER

THE appendage on the breast of the Turkey (*Meleagris gallopavo*), commonly called the beard, is unique in its development. Previous investigators have examined the beard of the domestic bird. Nitzsch (1867) stated that the bristles of which the beard is composed are hollow and devoid of barbs. A more detailed examination by Ficalbi (1891) led to the conclusion that the bristle is intermediate between a feather and a hair. De Meijere (1895), in his excellent discussion of filoplumes, considered Ficalbi's conclusion to be weak and called attention to the fact that structures somewhat analogous to the beard are fairly common in the Galliformes. The most thorough study of the morphology of the bristles and the histology of the prominence from which they arise was made by Bulliard (1926).

No prior investigation of the beard of the Wild Turkey appears to have been made. It was hoped that the shape of the cross section or some other character of the bristle would be found that would permit distinguishing between the wild and domestic birds, and between races of the wild bird. While this did not prove to be the case, the beard nevertheless has some interesting features.

A significant characteristic is the extent to which the bristles are arranged in bundles to give the appearance of branching (Plate 23). This is not true branching, since by the aid of a needle it is easily possible in most cases to separate the bundle into its components, the cementing material being detached as scales. Occasionally, however, two bristles were found so tightly cemented for distances up to 190 millimeters that mechanical separation was impossible. An extreme case of adhesion was found in a bristle of the Domestic Turkey (Plate 23). Here separation was accomplished with difficulty even with the use of sodium hydroxide. The extent of branching varies with the individual and has no relation to race. The four bundles illustrated, taken from the beard of a Florida Turkey (*M. g. osceola*), show from 3 to 14 bristles, the latter number being the maximum found in any beard. A beard of Merriam's Turkey (*M. g. merriami*) contained 459 bristles of which only 134 (29 per cent) were singles, the remainder being in bundles of two to nine. In each bundle, the bristles issued from a single follicle.

The total number of bristles in a beard shows considerable variation and has no relation to race or to the length of the beard, hence age. The number of bristles and their maximum length are shown in Table 1. One specimen of a double beard was examined, Nos. 3a and 3b representing respectively the upper and lower beards.

TABLE 1

NUMBER OF BRISTLES AND MAXIMUM LENGTH

Race	*Number*	*Area*	*Number of bristles*	*Maximum length (mm.)*
	1	Thomas Co., Ga.	254	273
	2	Cumberland Co., Va.	677	260
M. g. silvestris	3a	Stone Co., Miss.	254	255
	3b	Stone Co., Miss.	152	273
	4	Perry Co., Miss.	514	305
	5	Pocahontas Co., W. Va.	476	178
M. g. osceola	6	Glades Co., Fla.	347	193
	7	Glades Co., Fla.	514	325*
	8	Kerr Co., Texas	569	210
M. g. intermedia	9	Kerr Co., Texas	279	236
	10	Kerr Co., Texas	476	222
M. g. merriami	11	Navajo Co., Ariz.	213	139
	12	Navajo Co., Ariz.	459	238

* Single bristle. The next longest was 275 millimeters.

The Turkeys from the Thomasville, Georgia, area are considered to be intermediate between the Eastern and Florida races. Herbert Stoddard, from whom specimen No. 1 was obtained, informs me that the diagnostic characters favor the Florida race. I have placed it under the Eastern race since it resembles the latter in the coarseness and rectangular shape of the bristles.

The diameters of the bristles are shown in Table 2. The measurements are based on five bristles taken from each specimen. The greatest width was taken as the basis for comparison. Before the measurements were taken, the base of the bristle was drawn through a fold of fine emery cloth to remove the white scale-like coating. The readings were taken one centimeter from each extremity. There is no consistency in the diametric data. The bristles of the Florida Turkey appear to the naked eye to be decidedly more slender than those of the other races, yet the measurements can be matched by a specimen of the Eastern Turkey (No. 2) and Merriam's Turkey (No. 11). The consistently slight tapering of the bristles is believed to be due to their rubbing against each other and to contact with vegetation through which the Turkey passes.

Difficulty was encountered in making thin cross sections. The bristle is hard and brittle. A conchoidal surface is obtained by sectioning in the dry condition, and it is almost impossible to cut a

TABLE 2

DIAMETERS OF BRISTLES (IN MILLIMETERS).

Race	*Number*	*Average length of bristles measured*	*Diameter*					
			Base		*Middle*		*Tip*	
			Range	*Average*	*Range*	*Average*	*Range*	*Average*
M. g. silvestris	1	210	0.22–0.33	0.29	0.22–0.29	0.26	0.18–0.27	0.23
	2	241	0.17–0.24	0.21	0.16–0.20	0.18	0.15–0.18	0.16
	3a	237	0.22–0.29	0.26	0.17–0.26	0.21	0.16–0.23	0.19
	3b	232	0.26–0.29	0.28	0.23–0.26	0.24	0.18–0.26	0.22
	4	263	0.22–0.29	0.25	0.18–0.28	0.22	0.18–0.22	0.20
	5	167	0.20–0.24	0.22	0.15–0.22	0.18	0.11–0.22	0.16
M. g. osceola	6	135	0.15–0.22	0.19	0.14–0.22	0.17	0.11–0.18	0.14
	7	217	0.16–0.23	0.19	0.15–0.22	0.18	0.14–0.17	0.16
M. g. intermedia	8	215	0.26–0.28	0.27	0.18–0.23	0.21	0.17–0.20	0.18
	9	192	0.17–0.26	0.20	0.16–0.20	0.17	0.13–0.20	0.16
	10	187	0.18–0.22	0.20	0.15–0.22	0.19	0.12–0.19	0.16
M. g. merriami	11	130	0.15–0.18	0.16	0.13–0.17	0.15	0.11–0.15	0.13
	12	197	0.21–0.29	0.25	0.20–0.27	0.24	0.16–0.23	0.20
	13*	208	0.22–0.22	0.22	0.22–0.22	0.22	0.17–0.22	0.20

* Two bristles only.

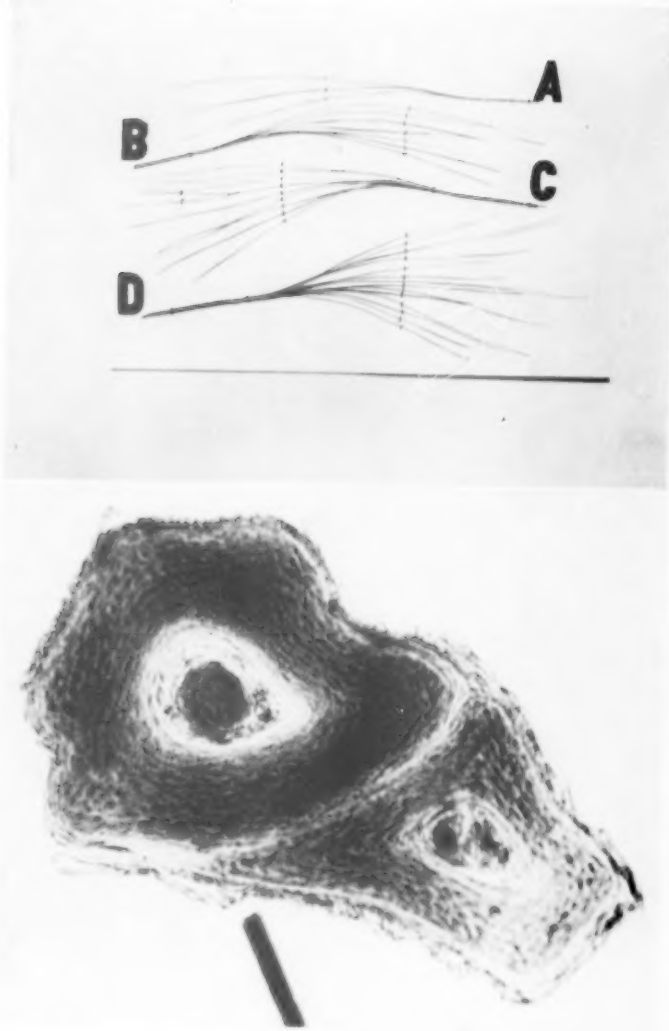
thin section without fracture. Dilute alkalis swell and soften the bristle readily, but the section on drying seldom returns to its original shape. The problem was solved by using wetting compounds, which are generally the sodium salts of organic sulphonates. They are available as commercial washing compounds. If a section of a bristle is left in a one per cent solution of a wetting agent for 24 to 48 hours, only a small amount of water is absorbed but it is sufficient to permit satisfactory cutting.

The bristle treated with a wetting agent is not sufficiently soft to be sectioned satisfactorily by embedding in paraffin. Mathiak (1938) has described a method of sectioning hairs by embedding them in collodion applied to the surface of a strip of balsa wood. With the bristles, the amount of collodion required to hold them firmly was too great to permit easy cutting. A modified technique, however, gave satisfactory results. Two strips of balsa wood, $25 \times 5 \times 3$ millimeters, were coated on one surface with collodion. As soon as this coating turned white, a second thin layer of collodion was applied. The softened bristle was placed on the collodion of one strip of balsa wood, the second strip superimposed, a small paper clamp applied, and the bristle allowed to stand for 30 minutes. Very thin sections, with practice, could then be cut by hand with a Gillette razor blade. The section was then placed on a glass slide and the excess wood cut away. Application of a lacquer solvent and teasing with a needle freed the section of bristle from the magma.

Hundreds of cross sections were made, but no regularity in shape could be found (Plate 24). The shape varies in a single bristle and between bristles from the same specimen. No such irregularity exists in contour feathers and mammalian hairs. In general the cross section of a bristle from the Eastern Turkey is roughly rectangular, but cross sections are found the shapes of which can be matched quite well by those of other races.

No chemical or mechanical method was found for isolating the structural units of the bristle. Under the microscope these are crescent-shaped and arranged in circles. Most of the melanin is deposited at the points of overlap.

There are other peculiarities of the bristles to which attention should be called. They grow continuously. On April 2, 1956, two male domestic Bronze Turkeys, eleven months of age, were secured from Professor John L. Adams and placed in the Vilas Park Zoo for the purpose of determining the rate of growth of the beard. The beards of both specimens had a maximum length of 64 millimeters. They were clipped to a length of 25 millimeters to minimize wear of



TURKEY BRISTLES. *(Above)* Bundles of Bristles from the Florida Wild Turkey. *(Below)* Intergrowth of Two Bristles of the Domestic Bronze Turkey.

CROSS SECTIONS OF BRISTLES FROM FOUR RACES OF THE WILD TURKEY. (*Left to right*) Base, middle, and tip of bristles. (*Top to bottom*) *M. g. merriami*, *M. g. silvestris*, *M. g. osceola*, and *M. g. intermedia*.

the new growth. A year later, April 18, 1957, the beards showed growths of 130 and 133 millimeters respectively. All the bristles in the beard of one specimen showed full growth. On the other hand, with the second bird, the lower half of the beard, comprising approximately 50 per cent of the bristles, showed no growth at all. I have no explanation for this phenomenon. Maximum growth of the bristles cannot be determined accurately because of wear and breakage at the ends. A length of 311 millimeters recorded for a male Wild Turkey in Virginia appears to be close to the maximum attainable.

Nearly every beard, regardless of its length, will show an occasional comparatively young bristle. The latter is easily recognizable, since the tip is sharp-pointed and colored light buff in contrast with the black color of the remainder of the bristle. Unless protected by being situated in the interior of the beard, the tip soon breaks off. Bristles with tips intact, ranging from 11 to 135 millimeters, have been observed. It is not known whether they result from infrequent shedding, from cessation of growth, or from the formation of new papillae in the follicle.

Usually only one beard is present on an individual, but multiple beards are known. I have before me a photograph showing five distinct beards on a male Rio Grande Turkey. This number has also been recorded on a female Domestic Turkey.

The beard is a poor sex character. Castration of young males does not prevent growth of the beard, and its development is therefore independent of a male hormone. It is usually found on the male but occurs quite frequently on females, particularly of the domestic strains. Information on the occurrence of a beard in the female Wild Turkey is scanty. According to Audubon (1831), females show a beard after attaining an age of three to four years. Unfortunately there is no reliable method of aging a female that is more than a year old. McDowell (1954) examined 557 female Wild Turkeys killed by hunters in Virginia and found that only four had beards. This is less than one per cent. In contrast, of 230 pen-reared female Wild Turkeys, having an age of 14 months, 17 (7.4 per cent) "bore beards that protruded beyond the contour breast feathers." Since every female has the prominence from which a beard may arise, it is necessary to part the breast feathers to determine whether a beard is present.

Incidence of beards in female Domestic Turkeys is occasionally high. Stanley J. Marsden of the Agricultural Research Service, U. S. Department of Agriculture, Beltsville, Maryland, in March, 1957, kindly examined 1373 Beltsville Small White females from

6 to 11 months of age. He found that 122 (8.9 per cent) had beards ranging in length from 3 to 63 millimeters, the average being 26 millimeters. Particularly interesting was his discovery of three females with multiple beards, two, three, and five respectively. McDowell (*op. cit.*) has suggested that the high incidence of beards in pen-reared female Wild Turkeys may be due to nutritional or genetic factors.

The classification of the bristles offers a problem. The absence of barbs and the presence of a pithy central cavity do not permit them to fall within the commonly accepted definition of a filoplume. On the other hand, seemingly of more importance is the fact that several bristles, as in the filoplumes, emerge from a single follicle. It would be difficult not to accept de Meijere's (*op. cit.*, pp. 569–570) opinion that filoplumes are rudimentary and that a central filoplume developed into a modern feather at the expense of its neighbors. It is inconceivable that the present contour feather arrived full-blown. The first feather was probably a solid shaft. In the next stage the pithy medulla developed, producing a *mesofiloplume*, of which the Turkey bristle is an example. It will be noted from the cross-sections that the medulla of the bristle is still very narrow in comparison with that of a contour feather. The final stage would be the development of barbs, barbules, and barbicels. De Meijere has suggested that birds were at one time covered entirely with filoplumes, and Bulliard expressed the belief that the bristles of the Turkey are allied to contour feathers.

For the contribution of beards, I wish to express my thanks to R. W. Bailey, Eugene H. Blake, Quentin Breland, L. F. Gainey, Caleb Glazener, Carl Havard, Henry S. Mosby, Lyle Sowls, and H. L. Stoddard.

LITERATURE CITED

AUDUBON, J. J. 1831. Ornithological biography. Edinburgh, Adam Black, 1: 15.

BULLIARD, H. 1926. La brosse du dindon (Meleagris gallopavo L.). Comp. Rend. Ass. Anat. Nancy, **21**: 132–145.

DE MEIJERE, J. C. H. 1895. Über die Federn der Vögel, insbesondere über ihre Anordnung. Morph. Jahrb., **23**: 562–591.

FICALBI, E. 1891. Sulla architettura istologica di alcuni peli degli uccelli con considerazioni sulla filogenia. Mem. Soc. Tosc. Sci. Nat., **11**: 227–266.

MATHIAK, H. A. 1938. A rapid method of cross-sectioning mammalian hairs. Journ. Wildl. Mgt., **2**: 162–164.

MCDOWELL, R. D. 1954. Productivity of the wild turkey in Virginia. Ph.D. Thesis, Va. Polytechnic Institute, p. 45.

NITZSCH, C. L. 1867. Pterylography. London, R. Hardwicke, p. 114.

College of Agriculture, University of Wisconsin, Madison 6, Wisconsin, May 2, 1957.

ANALYSIS OF MASS BIRD MORTALITY IN OCTOBER, 1954

BY DAVID W. JOHNSTON AND T. P. HAINES

In recent years there have come to the attention of ornithologists an increasing number of instances of mass bird mortalities in the eastern and southern United States. These instances have occurred at airport ceilometers, radio and television antennae, and tall buildings, and have been associated primarily with nocturnal autumnal migration. Various climatological, biological, and physical aspects of the mortalities have been investigated by ornithologists, especially in Tennessee, where instances of mass mortalities in the autumn have been more frequent than in other states (see Howell *et al.*, 1954). The most noticeable and widespread series of mortalities occurred in the fall of 1954 when, between October 5 and 8, twenty-five instances were reported from New York to the South Atlantic states; many of them claimed prominent places in newspaper and magazine accounts. Although these unprecedented mortalities are in a sense unfortunate, a compilation of the records and analysis of the data will help to supplement our present knowledge of nocturnal autumnal migration, inasmuch as each occurrence is a small sample, literally snatched from the air, from a flock of migrants. Furthermore, the largest kill in recorded history occurred at Warner Robins Air Force Base near Macon, Georgia, during this time, and a detailed study of this event has furnished intensive qualitative and quantitative data, thus complementing the extensive data revealed by a survey of the total mortality incidents over the eastern and southern states during this period.

Acknowledgements

A compilation of this broad a scope would have been impossible without the cooperation of many interested individuals. Space allows us to acknowledge only those who responded positively to a questionnaire, and we feel that the records compiled here represent most if not all of the recorded instances of bird mortality between October 5 and 8, 1954. Our thanks are due to the following: G. S. Raynor and J. J. Elliott (Mitchell Field, Hempstead, Long Island, N. Y.), L. Wilcox (Westhampton, N. Y.), J. K. Terres (New York, N. Y.), J. E. Trainer (Allentown, Pa.), H. B. Tordoff (Topeka, Kans.), M. B. Spencer (Winston-Salem, N. C.), E. M. Burton (Charleston, S. C.), J. T. Tanner (all records from Tennessee; see Tanner, 1954), T. A. Imhof and F. B. Daniel (Birmingham, Ala.), O. L. Austin and R. L. Edwards (Maxwell Air Force Base and Montgomery, Ala.), W. W. Griffin (Atlanta, Ga.), J. F. Denton (Augusta, Ga.), T. F.

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CAUSES

Most of the details of ceilometer mortality causes have been reviewed by Howell *et al.* (*op. cit.*) and are in agreement with the generalities set forth here. The late summer and autumn of 1954 was unusually hot and dry in the eastern and southern states; this protracted spell was virtually unbroken until the season's first cold front moved from New England (October 5) to the gulf states (October 8). Appearing immediately after the prolonged hot and dry season, the sudden change in weather conditions associated with the advancing front was rather severe: increased winds, decreased temperatures, drizzle or light rains, and lowered cloud ceilings. As the front advanced southward, it caught up with many of the migrants that were being pushed ahead of it. This was more noticeable at the southernmost locations (see Table 1). The sounds of migrants flying overhead were unusually noticeable on these nights, whereas on previous, clear nights, they were rarely heard. In fact, on the basis of the weather conditions mentioned above, ceilometer mortalities can be predicted rather accurately (see Laskey, 1956).

The precise role of each of the climatic conditions has not been determined, but, as far as mortalities were concerned, a lowered cloud ceiling had drastic effects on the migrants. As the cold front progressed southward, weather stations reported a ceiling sometimes as low as 800 feet, and apparently the nocturnal migrants were flying at or below this level. If they had been flying higher, they would not have collided with the various radio and television antennae mentioned below. Bartlett (*fide* Howell *et al.*, *op. cit.*) observed that birds fluttering around in the ceilometer beam must have come from higher elevations, but other observers reported that birds which passed through the ceilometer (apparently unaffected by it) were in level flight.

Thus the stage was set, as it were: a large mass of migrating birds was flying at night at unusually low heights. This being the case, at least three types of physical obstructions beset the migrants. The most potent of these was the airport ceilometer, which is an intense, narrow beam of light used commercially to detect the height of the cloud ceiling. It was this lighted "sky trap" which took the largest toll of birds; fifteen of the mortality instances were at ceilometers.

We believe that birds are attracted to this powerful beam of light and some fly on through it, but others become temporarily blinded and/or disoriented so that they either fly into each other or, more commonly, dash themselves against the ground, low buildings, or other objects. Indeed, an observer at Warner Robins Air Force Base noted birds flying straight downward in the beam and bouncing off a concrete runway! In addition to the mortality instances at the ceilometers, eight instances were reported at radio and television antennae, varying in height from 200 to 1062 feet. It is probable that birds are not attracted by the lights on these towers to the same extent that they are attracted by ceilometer beams; otherwise, more birds would have been killed at the towers. Rather, these towers serve primarily as physical obstructions to the low-flying birds. Finally, in at least three other instances birds struck tall buildings, and at Oak Ridge, Tennessee, the birds were apparently killed by striking high tension wires around a brightly illuminated parking area. In the final analysis, the innumerable instances of hemorrhages and broken bones now provide undisputed evidence that death came as the result of collisions with solid objects.

ANALYSIS OF RECORDS

Table 1 lists the twenty-five localities at which incidents of mortality were reported between October 5 and 8, 1954. The data from Dannelly Field and Maxwell Air Force Base at Montgomery, Alabama, have been combined, and the total number of individuals counted is not precise because the air base records were given in percentages. From six of the localities (Topeka, Greensboro, Shelbyville, Johnson City, Charleston, and Hunter Air Force Base) only the totals as indicated in the table were obtainable, but from the other nineteen localities, in the samples which were counted, the total number of each species was obtained.

From these figures plus an examination of the raw data from each station, several significant facts are noticeable. More instances of mortality and more birds were recorded in the southern states than in the northern states. On the night of October 5–6 at the five northernmost localities, at least 61 species and 2756 individuals were reported. The ten southern localities where mortalities occurred on October 6–7 recorded 51 species and 4478 individuals, and on October 7–8, the eleven southernmost localities reported 68 species and about 99,340 individuals.

In order to give the data from the nineteen localities as concisely as possible, a list of the species involved is presented. Following the

TABLE 1

LOCALITY DATA FOR MASS BIRD MORTALITY, OCTOBER, 1954

Locality	*Night of mortality*	*Number of species counted*	*Number of individuals counted*	*Total number estimated or counted*
Hempstead, N. Y.	Oct. 5–6	34	230	plus "others"
Westhampton, N. Y.	Oct. 5–6	48	596	2000
New York, N. Y.	Oct. 5–6	27	123	400
Allentown, Pa.	Oct. 5–6	38	210	210
Topeka, Kans.	Oct. 5–6	31	146	146
Topeka, Kans.	Oct. 6–7	29	147	147
Winston-Salem, N. C.	Oct. 6–7	21	198	plus "others"
Greensboro, N. C.	Oct. 6–7			30
Nashville, Tenn.	Oct. 6–7	21	255	255
Shelbyville, Tenn.	Oct. 6–7			300
Oak Ridge, Tenn.	Oct. 6–7	22	453	1000
Knoxville, Tenn.	Oct. 6–7	26	267	267
Johnson City, Tenn.	Oct. 6–7	30		1000
Smyrna, Tenn.	Oct. 6–7	18	100	600
Chattanooga, Tenn.	Oct. 6–7	35	681	plus "others"
Atlanta, Ga.	Oct. 7–8	28	327	600
Charleston, S. C.	Oct. 7–8	23		"many hundreds"
Birmingham, Ala.	Oct. 7–8	36	1283	1600
Montgomery, Ala.	Oct. 7–8	22	500	18650
Augusta, Ga.	Oct. 7–8	12	81	200
Warner Robins, Ga.	Oct. 7–8	53	2552	50000
Savannah, Ga.	Oct. 7–8	22	289	289
Travis Field, Ga.	Oct. 7–8	19	73	2000
Hunter Field, Ga.	Oct. 7–8	26		25000
Turner Field, Ga.	Oct. 7–8	14	101	101
Okefinokee Swamp, Ga.	Oct. 7–8	31	883	900
Totals	Oct. 5–8	ca. 88	ca. 9495	ca. 106804

species name is the total number recorded at the nineteen localities, and the number in parentheses is the frequency of occurrence, in per cent, for that species in these localities. In all, 86 species and 9136 individuals are enumerated. The number of individuals in the list differs from the total in Table 1 because of incomplete data from some localities.

Pied-billed Grebe, 2 (11); Green Heron, 1 (5); King Rail, 2 (11); Clapper Rail, 1 (5); Virginia Rail, 6 (21); Sora, 35 (42); Yellow-billed Cuckoo, 6 (16); Black-billed Cuckoo, 4 (16); Whip-poor-will, 3 (16); Flicker, 4 (11); Crested Flycatcher, 1 (5); Phoebe, 1 (5); Yellow-bellied Flycatcher, 5 (11); Acadian Flycatcher, 5 (11); Alder Flycatcher, 1 (5); Least Flycatcher, 2 (5); Wood Pewee, 7 (11); White-breasted Nuthatch, 1 (5); Red-breasted Nuthatch, 1 (5); Brown Creeper, 1 (5); House Wren, 1 (5); Winter Wren, 1 (5); Long-billed Marsh Wren, 2 (11); Catbird, 117 (63); Wood Thrush, 120 (63); Hermit Thrush, 1 (5); Olive-backed Thrush, 530 (68); Gray-cheeked Thrush, 175 (47); Veery, 91 (37); Golden-crowned Kinglet, 3 (16); Ruby-crowned Kinglet, 5 (21); White-eyed Vireo, 18 (21); Yellow-throated Vireo, 68 (47); Blue-headed Vireo, 8 (16); Red-eyed Vireo, 821 (95); Philadelphia Vireo, 97 (58); Black and White Warbler, 261 (100); Swainson Warbler, 3 (16); Worm-eating Warbler, 9 (21); Golden-winged Warbler, 6 (21); Blue-winged Warbler, 1 (5); Tennessee Warbler, 576 (79); Nashville Warbler, 18 (26); Parula Warbler,

113 (47); Yellow Warbler, 3 (11); Magnolia Warbler, 995 (100); Cape May Warbler, 19 (47); Black-throated Blue Warbler, 92 (58); Myrtle Warbler, 46 (16); Black-throated Green Warbler, 83 (63); Blackburnian Warbler, 177 (84); Yellow-throated Warbler, 2 (5); Chestnut-sided Warbler, 703 (79); Bay-breasted Warbler, 161 (63); Blackpoll Warbler, 203 (42); Pine Warbler, 106 (21); Prairie Warbler, 7 (21); Palm Warbler, 149 (47); Oven-bird, 1172 (100); Water-thrush, 71 (53); Kentucky Warbler, 18 (42); Connecticut Warbler, 24 (32); Mourning Warbler, 2 (11); Common Yellow-throat, 505 (95); Yellow-breasted Chat, 28 (47); Hooded Warbler, 125 (53); Black-capped Warbler, 3 (11); Canada Warbler, 30 (32); Redstart, 273 (95); Bobolink, 7 (16); Baltimore Oriole, 4 (16); Scarlet Tanager, 330 (84); Summer Tanager, 29 (42); Rose-breasted Grosbeak, 51 (42); Blue Grosbeak, 8 (16); Indigo Bunting, 450 (79); Painted Bunting, 1 (5); Dickcissel, 7 (21); Towhee, 1 (5); Savannah Sparrow, 33 (26); Grasshopper Sparrow, 3 (16); Chipping Sparrow, 3 (5); White-throated Sparrow, 10 (16); Lincoln Sparrow, 4 (5); Swamp Sparrow, 61 (26); Song Sparrow, 3 (16).

The species recorded in the largest numbers usually showed the highest frequencies of locations: Oven-bird 1172 and 100 per cent, Magnolia Warbler 995 and 100 per cent, Red-eyed Vireo 821 and 95 per cent, and Chestnut-sided Warbler 703 and 79 per cent. These figures indicate that the most abundant species were present along the entire front of migrating birds and were not distributed spottily among the various locations. There were 33 species of Parulidae with 5984 individuals, 13 species of Fringillidae with 635 individuals, 5 species of Vireonidae with 1012 individuals, and 5 species of Turdidae with 917 individuals. Of the total number of individuals, the Parulidae comprised 65.5 per cent, the Vireonidae 11.1, the Turdidae 10.0, and the Fringillidae 7.0.

Most of the species were common summer residents or transients at each locality, but proportional abundances were usually higher than local ornithologists would have predicted on the basis of field observations. Furthermore, certain rarities occurred at various localities. The occurrence of only a few individuals of the Whip-poor-will, Yellow Warbler, Golden-winged Warbler, Blue-winged Warbler, flycatchers, and perhaps others would indicate that the bulk of these populations had already migrated, a fact which is substantiated by examination of normal migration dates for these species at a given locality. A few species which normally spend the winter at these localities appeared in the mortality records, and these were primarily in the northern areas, indicating that migration for these species had, for the most part, just begun. Such species would include the Brown Creeper, Hermit Thrush, kinglets, and several sparrows. In addition to the usual conspicuous migratory species, it is of some interest to note among these nocturnal migrants an occasional Clapper Rail, Flicker, Pine Warbler (in the south), and Towhee.

Although we have not compared the number for each species from one locality to another, Howell (1955) has indicated that significantly different groups of migratory birds pass over neighboring localities (Nashville and Knoxville, Tenn.) on the same night. The sample which he examined, however, was relatively small, and the several variables of wind direction and velocity, cloud ceilings, and physical obstructions might throw doubt on the statistical validity of such data.

THE DATA FROM WARNER ROBINS

On the night of October 7–8, 1954, the largest recorded ceilometer kill in history occurred at Warner Robins Air Force Base, a few miles south of Macon, Georgia. It involved 53 species and an estimated 50,000 birds, 2552 of which were examined. This is not only the largest single number of birds yet examined from one location, but it also represents as random a sample as possible from nocturnal migrants at this time of year at this location. We were fortunate in several respects because, even though dead birds were strewn by the hundreds over the runways, taxi strips, grassy plots, and tops of buildings, the sample of 2552 birds which we examined was from one roof (beside the ceilometer) and had been shovelled up and raked together completely at random by the workmen. Had we arrived on the scene first, we might have selected the least damaged, most conspicuous, and rarer species, and the sample might have been less representative.

With this large number of freshly killed birds on our hands overnight, we had to make the most profitable use of them in a short period of time. For those species numbering less than 25, each individual was weighed, sexed, and aged. For those numbering more than 25, we selected about 25 at random from the pile—without respect to size, intensity of coloration, or sexual dimorphism. This small sample of the larger sample was also weighed, sexed, and aged, and notes were kept as to the relative fatness of each bird. The results of some of these calculations are given in Table 2. Only those species for which we had data from more than twenty birds are presented.

The data in Table 2 lend themselves to comparisons with lean weights obtained by other investigators. For example, Catbirds weighed by Baldwin and Kendeigh (1938) in July averaged about 34 grams, a weight which is somewhat lighter than the average given for the fat Catbirds in Table 2 (more than 37 grams). Similarly, comparisons can be made between the weights in Table 2 and body weights of lean birds given by Hartman (1955). In general, the weights of lean birds in summer given by Baldwin and Kendeigh

TABLE 2

WEIGHTS (IN GRAMS) AND PERCENTAGES BY SEX AND AGE OF CERTAIN BIRDS FROM WARNER ROBINS AIR FORCE BASE

Species	*Number dissected*	*Adult males*	*Immature males*	*Adult females*	*Immature females*	*Per cent male*	*Per cent adult*
Catbird	28	16[1]:34.0–42.9 (38.0)[2]	6:35.4–39.0 (37.5)	6:32.9–39.2 (36.4)		78	78
Wood Thrush	27	17:48.0–70.9 (56.0)		8:52.9–65.2 (58.7)	2:54.8–71.5 (63.2)	63	93
Olive-backed Thrush	36	4:35.2–39.9 (37.2)	15:31.8–50.0 (40.0)	3:33.2–41.5 (36.8)	14:34.4–40.7 (37.9)	51	19
Gray-cheeked Thrush	35	4:38.5–41.7	14:29.9–50.5 (42.8)	4:32.3–41.7 (37.3)	14:29.7–45.2 (38.6)	49	22
Yellow-throated Vireo	28	11:19.3–25.0 (23.2)	2:21.6–24.0 (22.8)	12:21.9–25.2 (23.1)	3:21.3–22.0 (21.7)	46	82
Red-eyed Vireo	26	4:19.5–23.9 (21.6)	9:17.7–23.6 (20.2)	11:16.1–25.7 (21.9)	2:20.9–22.5 (21.7)	50	58
Black and White Warbler	24	6:9.8–12.3 (11.6)	4:9.9–11.7 (10.7)	7:10.4–14.1 (12.0)	7:10.0–12.4 (11.0)	42	57
Tennessee Warbler	28	5:10.5–13.8 (12.1)	9:9.0–12.7 (11.4)	1:11.6	13:9.0–12.9 (10.9)	50	21
Magnolia Warbler	29	1:9.9	9:7.0–10.5 (9.1)	6:9.6–11.3 (10.5)	13:7.7–11.9 (9.3)	34	27
Blackburnian Warbler	25	4:11.8–14.9 (13.0)	10:10.2–13.8 (12.2)	3:10.8–12.7 (11.6)	8:9.6–14.9 (11.8)	53	23
Chestnut-sided Warbler	28	5:12.0–14.3 (12.8)	5:12.4–14.0 (13.1)	7:10.7–13.9 (12.0)	11:10.2–13.5 (12.3)	36	41
Bay-breasted Warbler	28	8:13.5–17.1 (15.4)	3:11.5–16.6 (14.6)	8:11.0–16.2 (14.3)	9:10.9–15.1 (13.5)	39	55
Oven-bird	35	8:20.4–23.9 (21.9)	11:20.1–24.8 (22.8)	4:20.0–22.7 (21.9)	12:20.6–24.8 (22.5)	54	33
Yellow-throat	27	13:9.1–12.5 (10.8)	2:10.3	3:8.3–10.2 (9.5)	9:8.6–11.3 (10.0)	57	57
Hooded Warbler	25	8:11.9–13.1 (12.6)	6:9.5–14.3 (12.2)	5:9.8–12.8 (11.7)	6:10.0–13.4 (12.1)	56	54
Redstart	31	8:8.3–9.6 (8.9)	7:7.2–9.3 (8.5)	2:6.9–8.3 (7.6)	14:6.8–9.4 (8.2)	50	33
Scarlet Tanager	27	2:30 5–31.6 (31.0)		25:31.9–44.9 (36.9)		7	100
Indigo Bunting	33	17:13.9–17.3 (15.9)	3:15.8–19.1 (17.5)	8:12.7–18.7 (15.7)	5:14.0–19.0 (17.2)	61	76

[1] Number in this class examined.
[2] Figures in parentheses are means.

(*op. cit.*, Table 5, pp. 442–445) and Hartman (*op. cit.*, pp. 232–234) are appreciably less than the weights for the same species presented in Table 2 for fat birds obtained in October.

A complete list of the 2552 birds has been presented in an earlier paper (Johnston, 1955) and will not be repeated here except in part. Of the 53 species, 25 were Parulidae, 7 Fringillidae, 4 Vireonidae, 4 Turdidae, and so on. These figures are more impressive when one

takes into consideration the number of individuals killed: the Parulidae ranked first with 1380 (54 per cent), the Vireonidae second with 393 (15.4 per cent), the Turdidae third with 378 (14.4 per cent), the Fringillidae fourth with 184 (7.1 per cent), and so on. Of equal interest were the most abundant species: Red-eyed Vireo 346 (13.6 per cent), Chestnut-sided Warbler 320 (12.5 per cent), Magnolia Warbler 301 (11.8 per cent), Oven-bird 236 (9.3 per cent), Olive-backed Thrush 232 (9.2 per cent), Indigo Bunting 171 (6.7 per cent), Scarlet Tanager 148 (5.8 per cent), Tennessee Warbler 121 (4.7 per cent), Blackburnian Warbler 102 (4.0 per cent), and so on. These nine species accounted for 77 per cent of the total birds examined in the sample of 2552. With the exception of the vireo and bunting, all of these species nest north of the Warner Robins area and are primarily birds of the coniferous forest.

Out of 646 birds of 50 species which could be sexed, 322 or 49.9 per cent were males. Out of 658 birds of 49 species whose age could be correctly determined, 309 or 46.9 per cent were adults. These data are significant only in the light of an analysis of the entire migratory group, since there are considerable variations from one species to another. It is of interest to note, however, that the ratio of males to females and of adults to immatures is nearly 50:50. Were it not for the large number of birds examined, a 50:50 ratio of adults to immatures in a fall migratory group would not be expected.

Fat conditions.—As some of the birds were being prepared as study skins, and as the sex and age were being determined from others, notes were kept on the gross estimates of fat deposits. One would expect *a priori* that these birds would be fat, generally speaking, in order to sustain long migratory flights; most of the species involved in the kill were birds which fly overseas to Central and South America for the winter. Such was the case; indeed, of about 600 birds examined for fat content, the majority were classified as "very fat." An occasional bird was somewhat less fat than others of the same species, but small variations in a large sample were to be expected. (Subjective descriptions of fat deposits, of course, were not infallible.) The fact that most birds were "very fat" suggests that they had already begun a long migratory flight which perhaps could have carried them to Central or South America nonstop. This idea is embraced in the concept of the "coastal hiatus" of the southern United States, which proposes that most individuals of certain species migrate over the Coastal Plain of Georgia and Alabama without stopping. This hypothesis originated with ornithologists who noted the general absence of certain migrants on the Coastal Plain, and is further strength-

ened by the recent mortality records, especially from southern Georgia. In reviewing these records, Johnston (1955) has demonstrated the presence in mortality incidents of several species which are not normally recorded at a given locality. Thus, it may well be true that the birds which were migrating over Warner Robins on this night were on their way nonstop to their wintering grounds farther to the south.

Fat deposits were particularly noticeable in subcutaneous and abdominal areas. Most conspicuous were the heavy subcutaneous deposits along the lower part of the spinal feather tract. The area from the base of the tail to the upper back was frequently a solid mass of fat, the removal of which often resulted in tearing the skin badly. From an immature female Water-thrush weighing 22.1 grams, 4.1 grams of fat (18.5 per cent) were removed by scraping the skin alone, and from an adult female Veery weighing 42.5 grams, 8 grams of fat (18.8 per cent) were removed from the skin. Many of the small specimens had to be soaked in white gasoline overnight in order to remove the fat completely, and some which were cleaned only superficially with carbon tetrachloride later became a menace to neighboring skins because of the "running" fat.

Notably lean were the two sparrows, one Savannah and one Swamp, which evidently were near the end of their migratory flight. Neither species winters appreciably south of Georgia. It is reasonable to assume that these had been fat birds at the beginning of their migration.

Considerable variation in weights is seen in Table 2, and one might wonder to what extent this might be due to variation in total fat content. Many of the birds from Warner Robins were given to Odum and Connell, who have extracted chemically and reported (1956) on the total lipids of the birds. In general, they found that fat content varied appreciably and that the heaviest birds were usually the fattest, but this was not always true. For example, five adult female Summer Tanagers had the following data:

Wet Weight	*Per Cent Fat of Wet Weight*
36.2 grams	37.5
36.8 grams	32.9
40.3 grams	34.2
40.4 grams	38.2
47.6 grams	41.2

Similarly, it has been demonstrated in premigratory Ruby-throated Hummingbirds that the heavier birds of both sexes are the fatter ones

(see Norris *et al.*). Thus, there is a rough correlation between fatness and heaviness, with the variations in fat deposits, at least in part, accounting for the variations in weight. Obviously the weights given in Table 2 must be considered in the light of the fatness of the birds.

In order to compare weight variability intraspecifically, the coefficient of variability has been calculated for some of the birds in Table 2. Monotypic species (Red-eyed Vireo) and species occupying relatively small geographic ranges (Blackburnian Warbler) showed at least as much variation in weight as polytypic species (Olive-backed Thrush) and species occupying relatively larger geographic ranges (Oven-bird). For example, immature males showed the following coefficients of variability: Red-eyed Vireo, 14.5; Olive-backed Thrush, 11.0; Oven-bird, 7.6; Blackburnian Warbler, 10.4. The data therefore suggest that insofar as fat migratory birds are concerned, weight variations attributable to subspecific differences are obscured by more pronounced variations in fat content.

Subspecific determinations.—Among the birds killed at Warner Robins were several polytypic species. Specimens of these, identified subspecifically, should indicate, at least roughly, the part of the continent from which the individuals came. Ideally it would be desirable to have specimens of all these polytypic forms, but the large sample (for example, 236 Oven-birds) made this impossible in most instances. Even with the relatively small number of birds prepared for subspecific determinations, we feel that the following data do give a crude indication of the origin of some of the migrants. The specimens were prepared by the senior author and have been identified by Dr. John W. Aldrich (United States Fish and Wildlife Service, Washington, D. C.), with the exception of the Water-thrushes identified by Dr. Alden H. Miller (Museum of Vertebrate Zoology, Berkeley 4, California). Although the following subspecies were definitely identified, this does not preclude the possibility that other subspecies might have been present in the larger portion of the sample which was not examined subspecifically; nor do the small proportions of subspecies within a given species necessarily reflect in an absolute fashion the proportions in the larger sample.

Hylocichla ustulata.—Three specimens were *swainsoni* and four were *incana*. According to Aldrich's interpretations of these subspecies, *swainsoni* is the population ranging in the southern Rocky Mountains, Great Basin, and Prairie Provinces of Canada, whereas *incana* is the bird from the Yukon and probably the northern Rocky Mountains. Olive-backed Thrushes from the eastern United States and Canada (*crymophila*) were absent from our sample of prepared specimens.

Hylocichla minima.—Seven specimens were referred to *minima*. The absence of *bicknelli* is perhaps significant.

Hylocichla fuscescens.—Three subspecies were found: 3 *fuscescens*, 1 *salicicola*, and 1 *fuliginosa*. An additional specimen was intermediate between *fuscescens* and *fuliginosa*. Thus, we obtained specimens from widely-spaced populations: the eastern (*fuscescens*) and western (*salicicola*) United States and Newfoundland (*fuliginosa*).

Dendroica petechia.—Although we obtained only two specimens of this late migrant, they represented extremely different-looking races: 1 *rubiginosa* and 1 *amnicola*.

Dendroica caerulescens.—Five specimens were identified as the nominate race *caerulescens*. We noted with interest the absence of *cairnsi*, which is known to breed in and migrate through Georgia.

Dendroica virens.—All eleven specimens represented the race *virens*. The absence of *waynei* at Warner Robins is significant.

Dendroica palmarum.—Ten specimens were *palmarum* and three *hypochrysea*. In the Warner Robins area during the winter *palmarum* far outnumbers *hypochrysea*.

Seiurus aurocapillus.—Seven specimens were *cinereus*, representatives of a western population, and three were *aurocapillus*, from more easterly populations. We obtained no *canivirens*, the breeding form from the southern Appalachian region.

Seiurus noveboracensis. One specimen was *notabilis* and four were *noveboracensis*. It is of some interest that the proportion of the more westerly form to the more easterly one was 1 : 4.

Geothlypis trichas. Four specimens represented the race *brachidactyla*.

Setophaga ruticilla. Two females have been identified as the western form, *tricolora*, but two males could not be identified subspecifically.

Passerculus sandwichensis. The one specimen of this early migrant was clearly *savanna*.

Ammodramus savannarum. This was probably a late migrant and was of the eastern race *pratensis*.

Melospiza georgiana. This early migrant was of the race *georgiana*.

These data, considered *in toto*, indicate that the mass of migrating birds flying over Warner Robins on this night was composed of typically eastern species and subspecies, either from the United States or Canada. Some of the birds, however, came from more widely-scattered points. Some evidently came from Alaska, central Canada, Newfoundland, and the western United States, thus presenting something of a convergence on the southern region from more northeasterly, northerly, and westerly points.

SUMMARY

Between October 5 and 8, 1954, twenty-five instances of mass bird mortality were recorded in the eastern and southern United States. They occurred primarily at airport ceilometers, but also at radio and television antennae and tall buildings. An advancing cold front in the autumn is believed to have precipitated these mass mortalities by bringing together adverse weather conditions (especially a lowered cloud ceiling), nocturnal migrants, ceilometers and/or tall obstructions.

More than 100,000 birds of 88 species were killed at the 25 localities during these three nights. The Oven-bird, Magnolia Warbler, Red-eyed Vireo, and Chestnut-sided Warbler were the most abundant species recorded at the sites. Most of the 88 species were common summer residents or transients at these localities, but a few supposed nonmigrants and winter birds were also killed.

At Warner Robins Air Force Base, Georgia, the largest ceilometer kill in recorded history occurred on October 8, 1954: 53 species and an estimated 50,000 individuals were killed. From these, a sample of 2552 birds was examined. Data on weight, sex, age, fat deposition, and subspecific determination are presented for many of the species. Weight variation among these fat fall migrants is believed to be due primarily to variation in fat deposits. Subspecies recorded in the kill indicate a convergence on this area by migrants from northeasterly northerly, and westerly points.

LITERATURE CITED

BALDWIN, S. P., and S. C. KENDEIGH. 1938. Variations in bird weights. Auk, **55**: 416–467.

HARTMAN, F. A. 1955. Heart weight in birds. Condor, **57**: 221–238.

HOWELL, J. C., A. R. LASKEY, and J. T. TANNER. 1954. Bird mortality at airport ceilometers. Wilson Bull., **66**: 207–215.

HOWELL, J. C. 1955. A comparison of ceilometer mortality at Knoxville and Nashville, Tennessee, in 1951 and 1954. Migrant, **26**: 53–57.

JOHNSTON, D. W. 1955. Mass bird mortality in Georgia, October, 1954. Oriole, **20**: 17–26.

LASKEY, A. R. 1956. Bird casualties at Smyrna and Nashville ceilometers, 1955. Migrant, **27**: 9–10.

NORRIS, R. A., C. E. CONNELL, and D. W. JOHNSTON. 1957. Notes on fall plumages, weights, and fat condition in the Ruby-throated Hummingbird. Wilson Bull., **69**: 155–163.

ODUM, E. P., and C. E. CONNELL. 1956. Lipid levels in migrating birds. Science **123** (3203): 892–894.

TANNER, J. T., *et al.* 1954. Bird mortality during night migration, October 1954. Migrant, **25**: 57–68.

Department of Biology, Mercer University, Macon, Georgia, September 25, 1956.

FOOD AND FEEDING HABITS OF THE SCAUPS IN CONNECTICUT WATERS

BY JOHN M. CRONAN, JR.

As part of a general investigation of scaup in Connecticut waters during the period from October, 1952 to May, 1954, data were obtained on the food and feeding habits of the Greater Scaup Duck (*Aythya marila*) and the Lesser Scaup Duck (*Aythya affinis*). The data pertaining to the food habits concern the particular species, but because of the difficulty of distinguishing the two species of scaups in the field, the feeding habits data pertain to either or both species. Hunter bag checks and scaup trapping have indicated that the Lesser Scaup comprise less than twenty per cent of the wintering population.

All except two of the ducks examined in the food habit study were collected in October, November, and December. One Lesser Scaup was collected in February and one Greater Scaup in March. However, as the birds winter in the area only seven months of the year, samples taken during three months of the year represent a good percentage of the time that the ducks are in Connecticut waters. Observations have shown that many of the feeding areas are used throughout the wintering season. This may indicate that the same foods were taken during the entire stay of the birds. Also, large food items such as the blue mussel (*Mytilus edulis*) and sea lettuce (*Ulva lacunata*), which can actually be seen in the birds' bills, were observed being taken during the entire stay of the ducks.

No records were found that indicated that the scaups had been previously collected in Connecticut for food habit study. Cottam (1939) summarized the food habit studies of scaup up to that time. A large number of birds that were covered in Cottam's summary were taken in fresh waters. The one large group of Greater Scaup that was collected in salt water was taken on or near Pacific Coast oyster beds (Kubichek, 1933) in a study to determine what, if any, damage scaup did to oyster beds. Thus, these data are not applicable to the coastal waters of Long Island Sound. Foley and Taber (1952) collected forty-three Greater and seven Lesser scaup in the Long Island region in 1949–50 and gave data on twenty Greater and five Lesser scaup collected in earlier years.

All of the common and scientific names of the mollusca used in this paper are after Abbott (1954). The authority for the plant names is Fernald (1950).

Most of the scaup stomachs were collected by the author from

hunters, but some stomachs were also obtained from birds collected by the author and by members of the Connecticut State Board of Fisheries and Game.

The term "stomach," as used in this paper, includes the gullet, proventriculus, and gizzard. The gullet and proventriculus were examined in the field and preserved only if they contained food.

I am indebted to Mr. James Bishop, Mr. Mason Belden, and Miss Ruth Billard of the Connecticut State Board of Fisheries and Game for their assistance during the study. Thanks are also due Dr. Russell P. Hunter of the University of Connecticut and Dr. Jacob Shapiro and Mr. B. F. McCamey, formerly of the University of Connecticut.

The facilities of the Bingham Oceanographic Laboratory in New Haven were made available for the food habits study through the courtesy of the director, Dr. Daniel Merriman.

Dr. John Rankin of the University of Connecticut and Mr. Howard Saunders of the Bingham Oceanographic Laboratory were of great assistance in identifying the invertebrate foods of the scaup.

Mr. George Bakelin of Fairfield, Connecticut, generously donated the launch with which a great deal of the study was made.

Portions of the data are taken from a thesis submitted by the author in partial fulfillment of the requirements for the degree of Master of Science in Wildlife Management, University of Connecticut. Funds for the study were supplied by Connecticut State Board of Fisheries and Game under Federal Aid Project W-7-R.

Food Habits of Greater Scaup.—Animal food made up 93.4 per cent of the total food volume and occurred in 96.6 per cent of the 119 Greater Scaup stomachs analyzed (Table 1). Animal food was more predominant in the above stomachs than in the Greater Scaup discussed by Cottam (1939) and Foley and Taber (1950), probably owing to the fact that all of the birds used in this study were taken from coastal waters. The blue mussel was the most important animal food by volume, making up 20.6 per cent of the total food volume and occurring in 25.2 per cent of the stomachs examined. The channeled barrel-bubble (*Retusa canaliculata*) was the most important animal food by frequency, occurring in 34.5 per cent of the stomachs, but because of its small size it made up only 0.7 per cent of the total food volume. The dwarf surf clam (*Mulinia lateralis*) was second in importance both by volume (16.0 per cent) and by frequency of occurrence (33.6 per cent). The fragile spoon clam (*Periploma fragile*) occurred in 30.3 per cent of the stomachs but contributed only 4.8 per cent of the total food volume.

The mollusca comprised the most important food of Greater Scaup

TABLE 1

FOOD EATEN BY 119 GREATER SCAUP DUCK COLLECTED IN 1952–53 ALONG THE CONNECTICUT COAST OF LONG ISLAND SOUND

Species	*Volume*		*Occurrence*	
	Cubic centimeters	*Per cent*	*Number*	*Per cent*
Plant Food				
Sea lettuce (*Ulva lacunata*)	11.2	3.6	6	5.0
Bulrush (*Scirpus* sp.)	tr.	tr.	5	4.2
Sago pondweed (*Potamogeton pectinatus*)	0.1	tr.	1	0.8
Pondweed (*Potamogeton pusillus*)	tr.	tr.	1	0.8
Floating-leaf pondweed (*Potamogeton natans*)	tr.	tr.	1	0.8
Pondweed (*Potamogeton* sp.)	tr.	tr.	1	0.8
Bayberry (*Myrica pennsylvanica*)	tr.	tr.	1	0.8
Undetermined Plant Food	9.4	3.0	34	28.6
Sub-total, Plant Food	20.6	6.6	46	38.7
Animal Food—Mollusca				
Blue mussel (*Mytilus edulis*)	64.5	20.6	30	25.2
Dwarf surf clam (*Mulinia lateralis*)	50.0	16.0	40	33.6
Fragile spoon clam (*Periploma fragile*)	15.0	4.8	36	30.3
Amethyst gem clam (*Gemma gemma*)	6.8	2.2	4	3.4
Atlantic nut clam (*Nucula proxima*)	2.5	0.8	33	27.7
Transverse ark (*Anadara transversa*)	tr.	tr.	3	2.5
Eastern oyster (*Crassostrea virginica*)	tr.	tr.	1	0.8
Undetermined pelecypoda	37.6	12.0	19	15.0
Common periwinkle (*Littorina littorea*)	11.6	3.7	12	10.1
Channeled barrel-bubble (*Retusa canaliculata*)	2.3	0.7	41	34.5
Northern yellow periwinkle (*Littorina obtusata*)	2.3	0.7	7	5.9
Eastern mud nassa (*Nassarius obsoletus*)	2.2	0.7	14	11.8
Periwinkle (*Littorina* sp.)	0.3	0.1	4	3.4
New England nassa (*Nassarius trivittatus*)	0.2	0.1	9	7.6
Three-lined odostome (*Odostomia trifida*)	0.1	0.1	3	2.5
Atlantic oyster drill (*Urosalpinx cinerea*)	0.0	tr.	4	3.4
Lunar dove-shell (*Mitrella lunata*)	0.0	tr.	12	10.1
Well-ribbed dove-shell (*Anachis translirata*)	tr.	tr.	4	3.4
Alternate bittium (*Bittium alternatum*)	tr.	tr.	2	1.7
Knobbed whelk (*Busycon carica*)	tr.	tr.	1	0.8
Adam's baby-bubble (*Acteon punctostriatus*)	tr.	tr.	3	2.5
Green's miniature cerith (*Cerithiopis greeni*)	tr.	tr.	1	0.8
Double-sutured odostome (*Odostomia bisuturalis*)	tr.	tr.	1	0.8
Odostome (*Odostomia seminuda*)	tr.	tr.	1	0.8
Common northern lacuna (*Lacuna vincta*)	tr.	tr.	1	0.8
Undetermined Mollusca	76.0	24.3	39	32.8
Animal Food—Crustacea				
Rock crab (*Cancer* sp.)	9.9	3.1	2	1.7
Mud crab (*Panopeus herbsti*)	4.0	1.3	3	2.5
Small hermit crab (*Pagurus longiocarpus*)	tr.	tr.	1	0.8
Undetermined Decapoda	tr.	tr.	4	3.4
Amphipod (*Ampelisca compressa*)	tr.	tr.	1	0.8
Animal Food—Animal Detritus	7.3	2.3	30	25.2
Sub-total, Animal Food	292.4	93.4	115	96.6
Total, All Food	313.0	100.0	119	100.0
Gravel	34.0	9.8[1]	66	55.5
Shot	0.1	tr.	2	1.7
Sponge rubber	tr.	tr.	2	1.7
Coal	tr.	tr.	1	0.8
Total Contents	347.1	—	—	—

[1] Per cent of total contents.

in the study area, making up 86.7 per cent of the total food contents of the stomachs and 92.8 per cent of the animal food. The pelecypoda composed 56.4 per cent of the total food, the gastropoda 6.0 per cent of the total food and undetermined mollusca made up 24.3 per cent of the total food. Mollusca occurred in 97.5 per cent of all the Greater Scaup stomachs analyzed. The remainder of the animal food consisted of rock crab (*Cancer* sp.), representing 3.1 per cent of the total food volume and occurring in 1.7 per cent of the stomachs; mud crab (*Panopeus herbsti*), representing 1.3 per cent of the total food volume and occurring in 2.5 per cent of the stomachs; the small hermit crab (*Pagurus longiocarpus*), occurring in one stomach; and an amphipod (*Ampelisca compressa*), occurring in one stomach.

Plant food comprised only 6.6 per cent of the total food volume, but occurred in 38.7 per cent of the stomachs. The only important Greater Scaup plant food in the area is sea lettuce (*Ulva lacunata*), which made up 3.6 per cent of the total food volume and occurred in 5.0 per cent of the stomachs. Bulrush (*Scirpus* sp.) occurred in 4.2 per cent of the stomachs, but its volume was insignificant. Undetermined plant food occurred in 28.6 per cent of the stomachs and made up 3.0 per cent of the total food volume.

It is probable that plant food, primarily the marine algae such as sea lettuce, make up a much larger percentage of the total food taken than can be shown by stomach analysis. The fast rate at which soft materials such as plant food must pass through the anterior portion of the digestive tract makes it very difficult to obtain a true picture of their value. A record was kept of the number of Greater Scaup gizzards that were stained green on their inside walls, as it was thought that this might give further indications of feeding on plant materials. The number of green-stained gizzards amounted to 63, or 53.0 per cent of all gizzards taken. 17 of the 63 green-stained gizzards had no trace of plant food in them.

Inanimate material made up 9.8 per cent of the volume of the total contents. Gravel occurred in 55.5 per cent of the stomachs and was the predominant inanimate material. Shot and sponge rubber were found in two stomachs and a piece of coal in one stomach.

Food Habits of Lesser Scaup.—Of 129 scaup collected for stomach analysis, 10, or 8.4 per cent, were Lesser Scaup.

In its food habits, even in coastal waters, the Lesser Scaup appears to feed more on plant material than the Greater Scaup; animal and plant foods occur with equal frequency (Table 2). Plant food constituted 38.3 per cent of the total food volume and animal food the remaining 61.7 per cent.

The Lesser Scaup from Connecticut waters utilized more animal food than those studied by Cottam (1939), but the Lesser Scaup discussed by Foley and Taber (1952) had food habits similar to those of the Connecticut birds.

The mollusca made up all of the animal material in the stomachs, with the pelecypoda composing 52.7 per cent of the total contents and 85.4 per cent of the animal food. Gastropods were insignificant

TABLE 2

FOOD EATEN BY 10 LESSER SCAUP DUCK COLLECTED IN 1952–53 ALONG THE CONNECTICUT COAST OF LONG ISLAND SOUND[1]

Species	Volume		Occurrence	
	Cubic centimeters	Per cent	Number	Per cent
Plant Food				
Sea lettuce (*Ulva lacunata*)	7.1	35.8	1	11.1
Saltmarsh bulrush (*Scirpus robustus*)	0.5	2.5	2	22.2
Undetermined Plant Remains	tr.	tr.	3	33.3
Sub-total, Plant Food	7.6	38.3	5	55.6
Animal Food—Mollusca				
Dwarf surf clam (*Mulinia lateralis*)	4.4	22.4	4	44.4
Atlantic nut clam (*Nucula proxima*)	0.3	1.3	2	22.2
Fragile spoon clam (*Periploma fragile*)	tr.	tr.	1	11.1
Undetermined Pelecypoda	5.8	29.0	2	22.2
New England nassa (*Nassarius trivittatus*)	0.0	0.4	1	11.1
Channeled barrel-bubble (*Retusa canaliculata*)	tr.	tr.	1	11.1
Undetermined Mollusca	1.6	8.1	1	11.1
Animal Food—Animal Detritus	0.1	0.6	3	33.3
Sub-total, Animal Food	12.3	61.7	5	55.6
Total, All Food	19.9	100.0	9[2]	100.0
Gravel	5.3	21.1[3]	6	66.7
Total Contents	25.2	—	—	—

[1] One bird was collected from Trustroms Pond, Rhode Island.
[2] One gizzard contained gravel only.
[3] Per cent of total contents.

in volume. Undetermined mollusca made up 8.1 per cent of the total volume.

Sea lettuce was the most important plant food by volume, but occurred in only one stomach. Saltmarsh bulrush (*Scirpus robustus*) was present in two, or 22.2 per cent, of the stomachs that contained food but only amounted to 2.5 per cent of the total food volume.

Gravel was found in 66.7 per cent of the Lesser Scaup stomachs and made up 21.1 per cent of the total stomach contents.

Availability of Scaup Foods.—128 scaup of both species were collected in Connecticut. 30 were collected between New Haven and Stratford and 98 between New Haven and Saybrook. There was a

great difference in the importance of the various food items in the two areas mentioned.

Table 3 illustrates the differences between the two areas. Percentages are based on the number of stomachs taken in each area, and both species of scaup are included. The area titled "New Haven to Saybrook" includes New Haven Harbor.

It can be seen that there is a large difference in the most important foods in the different areas. The reason for this appears to be availability.

In an effort to determine the availability of various duck food organisms along the section of the coast in which stomachs were obtained, a series of bottom samples was taken in areas where scaup

TABLE 3

PLACE AND OCCURRENCE OF IMPORTANT SCAUP ANIMAL FOODS

Species of Animal Food in Stomach Contents	*New Haven to Saybrook*	*New Haven to Stratford*
	Per cent occurrence	*Per cent occurrence*
Atlantic nut shell (*Nucula proxima*)	35.7	0.0
Dwarf surf clam (*Mulinia lateralis*)	41.8	10.0
Channeled barrel-bubble (*Retusa canaliculata*)	40.8	6.6
Blue mussel (*Mytilus edulis*)	8.2	73.3

were observed feeding and in areas where no feeding was observed. In most cases the feeding areas contained a high percentage of the same organisms that were found in the scaup stomachs obtained in that area. The non-feeding areas that were sampled did not at any time contain duck food organisms in any large quantity.

It appears from the scaup stomach analysis and the sampling of the feeding areas that the most important animal foods of the scaup in Connecticut's coastal waters are the dwarf surf clam and the blue mussel, and that the most important plant food is sea lettuce.

The blue mussel, whenever common, appears to be a favorite scaup food. Foley and Taber (1952) found it first both in frequency of occurrence and percentage of volume in the Long Island area, and Cottam (1939) also listed it as the most important individual animal food for scaup. The remainder of the animal foods as individual species appear to be only locally important.

In the majority of the feeding areas sampled, either the dwarf surf clam or the blue mussel was the predominant animal species. It might be assumed that the feeding areas were selected because either one of these two favorite food items was present. However, it appears from this and other studies that although mollusks in general are a favorite scaup food in coastal regions, the most important food for scaup in a given area is the most prevalent mollusk species in that area. Norton (1909) examined one scaup in Maine and found the stomach filled with the balthic macoma (*Macoma balthica*), and Lynch (1939) in Rhode Island found that the Atlantic surf clam (*Spisula solidissima*) was the predominant food item in the few scaup stomachs he examined. Munro (1941) stated that the foods of scaup in the coastal waters of British Columbia were gastropods, sea lettuce, crustaceans, and the eggs of herring (*Clupea pallasii*), in the order of their importance. It can be seen that in different areas, different mollusks are the predominant scaup food. Apparently, mollusks, at least in coastal waters, are a very important scaup food, but the particular molluscan species utilized for food is determined by availability.

Feeding Habits.—A total of 338 different observations of feeding scaup were obtained during the study. At the time of observation the following data were recorded: hour of day, wind direction, weather, water condition (i.e. calm, rough, etc.), stage of tide, and water and air temperature. Data were obtained for the same day from the local weather bureau as to the average and maximum wind velocity and the average, maximum, and minimum air temperatures.

It was apparent during the observations and upon compilation of the data that the factors recorded had little, if any, effect on scaup feeding.

Scaup were observed feeding during all periods of the daylight hours from dawn to dusk. No effort was made to obtain data on night feeding. The stage of the tide affected scaup feeding only in certain areas. For example, in areas where mussels were the main food item and the mussel beds were exposed at low tide there was little or no scaup feeding at low tide, since the birds normally will not feed out of water. In localities where the mussel beds were submerged at all tidal stages, the birds were observed feeding during all stages of the tide. Only the most severe weather and water conditions affected the scaup feeding. Rain, snow, and sleet did not appear to affect it. On occasion scaup were observed feeding when the waves were as high as three feet. The birds were also observed feeding in the breaking surf.

The strongest water current in the study area, over three knots at the mouth of the Housatonic River at certain stages of the tide, did not affect scaup feeding; the birds were observed many times feeding in the midst of the current.

The winter range of water and air temperatures in the area studied had no apparent effect on scaup feeding, nor did the wind direction or sky cover.

Scaup were observed feeding without any evidence of active competition with Old-squaws (*Clangula hyemalis*), American Golden-eyes (*Bucephala clangula*), White-winged Scoters (*Melanitta deglandi*), Mallards (*Anas platyrhynchos*), Black Ducks (*Anas rubripes*) and Red-breasted Mergansers (*Mergus serrator*). Herring Gulls (*Larus argentatus*) often robbed scaup of their food, but this would never force more than a few birds to stop feeding.

The greatest known depth to which scaup were observed feeding during the study was 23 feet. Most of the feeding was done in less than five feet of water. Scaup in the study area appeared to prefer feeding in shallow waters, but most of the feeding observations were made in areas where the blue mussel was the most abundant food; thus the preference for shallow water feeding may be due to the fact that the blue mussel is a shallow-water species.

Human activity did have a strong effect on scaup feeding. Areas that were heavily hunted were not subject to scaup feeding during the hunting season. During the fall and spring many of the feeding areas were not utilized when fishing and boating activities were going on. Even during mid-winter when a comparatively balmy Saturday or Sunday encouraged human activity along the shore, the scaup would not be present in their normal feeding areas.

The dives of 69 feeding scaup were timed and the average dive was found to be 20.4 seconds in duration, with a range of nine to 33 seconds. Bent (1923) states that Greater Scaup dives vary from 20 to 29 seconds and Phillips (1925) doubts if Lesser Scaup stayed under water more than 35 seconds, although 50 to 60 seconds had been reported for the Greater Scaup. Cottam (1933) says the time between dives for Lesser Scaup is slightly longer than the time under water. This was not the case with the scaup observed feeding in the present study area; the time between dives was slightly less than the time under, except when a bird obtained an exceptionally large mussel or large piece of sea lettuce. By comparison with scaup, the average length of time for dives of other waterfowl in the study area were: fifteen White-winged Scoter dives, 32.7 seconds; three American Golden-eye dives, 30.3 seconds; seven Buffle-head dives,

24.1 seconds; three King Eider (*Somateria spectabilis*) dives, 13.0 seconds; and two Red-breasted Merganser dives, 19.5 seconds.

Bent (1923) states that scaup swim under water with their wings tightly closed. This was borne out by the present study; scaup observed from above used only their feet for underwater swimming. When feeding on large, heavy substances such as blue mussels they would "chew" their food at the surface with their bills in the water; however, when "chewing" lighter food, such as sea lettuce, their heads were kept out of the water.

Scaup in rafts often do not all feed at the same time. Birds at one end of the raft may be feeding while those at the other end may be resting. Occasionally, feeding and non-feeding birds will be interspersed. When rafts of scaup are feeding in a current they often "drift feed." That is, the raft will be strung out in a line in the current, and as the birds go by a feeding area they feed as they drift. After they have drifted a certain distance beyond the feeding area, they fly to the other end of the raft and again drift by the feeding area. In many cases when large groups are "drift feeding," there are always birds flying up-current, and an appearance of perpetual motion often prevails for two or three hours at a time. Drift feeding is not necessarily due to the strong current, since scaup were often seen feeding in place in the same current that they "drift fed" in, with no apparent difficulty in holding their positions.

SUMMARY

Animal food comprised 93.4 per cent of the contents of the Greater Scaup stomachs examined and the most important animal foods were mollusks. Sea lettuce was the only important plant food of the Greater Scaup. The Lesser Scaup stomachs examined indicated that animal food makes up 61.7 per cent of their diet, and as in the Greater Scaup the most important animal foods were mollusks and the most important plant food sea lettuce.

Scaup feeding areas were sampled and most of the areas had quantities of the same food items that were found in the scaup stomachs. None of the non-feeding areas examined had scaup food items present in any quantity.

Mollusks were unquestionably the favorite scaup food, but the particular molluscan species taken appeared to depend upon availability.

Scaup feeding did not appear to be affected by any factor except human activity.

LITERATURE CITED

ABBOTT, R. T. 1954. American seashells. New York, D. VanNostrand Co., Inc., 541 pp.

BENT, A. C. 1951. Life histories of North American waterfowl (Order Anseres). New York, Dover Publications, Inc., 1: 207–224.

COTTAM, C. 1933. Feeding habits of the Lesser Scaup Duck. Condor, 35: 118–119.

COTTAM, C. 1939. Food habits of North American diving ducks. U. S. D. A. Tech. Bull. 643, 140 pp.

FERNALD, M. L., ed. 1950. Gray's manual of botany. 8th ed. New York, American Book Co., 1632 pp.

FOLEY, D. D., and W. R. TABER. 1952. Long Island waterfowl investigations. P. R. Proj. 52-R, Final Report. New York, Cons. Dept., 296 pp.

KUBICHEK, W. F. 1933. Report of the food of five of our most important game ducks. Iowa St. Coll. Jour. Sci., 8: 107–126.

LYNCH, J. J. 1939. Marine algae in food of Rhode Island waterfowl. Auk, **56**: 374–380.

MUNRO, J. A. 1941. Studies of waterfowl in British Columbia. Greater Scaup Duck, Lesser Scaup Duck. Can. Jour. Res. (Sect. D), 19: 113–138.

NORTON, A. H. 1909. The food of several Maine water birds. Auk, **26**: 438–440.

PHILLIPS, J. C. 1925. A natural history of the ducks. 3. Boston, Houghton Mifflin Co.

Dept. of Agriculture and Conservation, Division of Fish and Game, Providence, Rhode Island, August 6, 1956.

FIELD OBSERVATIONS PERTAINING TO THE SYSTEMATIC STATUS OF THE GREAT WHITE HERON IN THE FLORIDA KEYS

BY ANDREW J. MEYERRIECKS

Of the multitude of fascinating biological problems encountered in the Florida Bay region, none seems to have excited as much interest among ornithologists as the systematic status of the Great White Heron (*Ardea occidentalis*) and its relationship to the Great Blue Heron (*Ardea herodias*). In his recent analysis of this problem, Mayr (1956) emphasized the necessity of substituting solid field work for any further speculation. During the period from December 10, 1955 to May 20, 1956, I had the opportunity of making daily observations of the herons of Florida Bay. Although my primary concern was with comparative courtship behavior, much information obtained was pertinent to the problem of the systematic status of the Great White Heron. The following is a summary of my field work relating to this problem.

Area studied.—The maps (Figures 1 and 2) show the areas covered during this study. The keys visited during the period mentioned above were Bottlepoint, Cotton, Cowpens, Johnston, Key Largo, Low, Lower Matecumbe, Plantation, Stake, Upper Matecumbe, West, and Windley.

Behavior.—Considerable information was accumulated on the behavior of Great White and Great Blue herons in Florida Bay, but since the problem in question is a taxonomic one, the description and analysis of behavior in these birds will be presented elsewhere. However, as far as their behavior aids in clarifying the systematic status of the birds, it can be stated here that the behavior of the blue and white birds shows no significant differences. Although he gave no details, Bond (1935) likewise found that the Great White and Great Blue herons of the West Indies "behave precisely alike."

Holt (1928) argued, in defense of his contention that the Great White Heron was a distinct species, that the white birds were shyer than the blue ones; this position cannot be defended on the basis of my observations. Those white and blue birds which were exposed daily to the visits of sport fishermen, bird watchers, etc. (e.g., along the intracoastal waterway), were quite tame as compared to those inhabiting the more remote keys. Some of my journal notes give the impression that in occasional situations the blue birds are shyer than the white ones. Two excerpts from my journals should suffice:

"December 26, 1955.—Four whites and one blue in shallows near Bottlepoint Key—the blue is standing about 25 yards from the four whites—the blue shows low-intensity escape reactions as boat drifts closer—four whites are actually closer to boat, but escape reactions very low—the blue turns and wades away very slowly, then flushes—still wary as it lands about 50 yards away—whites hold their ground."

"January 25, 1956.—Poling slowly around Bottlepoint Key—eight *Ardea* standing in shallows—7 white, 1 blue—blue extremely wary—shows high intensity escape behavior, flushing readily—lands about 30 yards beyond last white bird—still wary—no whites flush."

There is, however, no consistent difference of behavior between the blue and white birds. Other notes reveal varying degrees of shyness exhibited by individuals in groups consisting entirely of white birds. It is my impression that "shyness" cannot be used here as a species characteristic.

In addition to shyness, Holt (1928) discussed three additional behavioral points in favor of a specific status of the white birds: 1) white birds are solitary, blue birds gregarious; 2) white birds are much fiercer and more pugnacious than blue ones; and 3) white birds are diurnal, while blue birds feed throughout the day and night. Although the populations of the white birds are not nearly as large as many populations of blue birds from the mainland, the white ones cannot be categorized as solitary. I have numerous records of groups of white birds feeding, courting, and nesting in close proximity. A minimum of eleven white birds nested on Cotton Key (see Table 2), and at least this many whites were seen frequently in one group feeding on the exposed flats immediately south of Cotton Key. I could find no significant differences in the attack behavior of the adult white birds as compared to that of the blue ones; blue and white young were equally vigorous in intra-nest disputes in nests on Cotton Key which contained mixed broods. After the young had hatched on Cotton Key, the white parents visited their feeding areas throughout the night. On many occasions, white birds fed during the night within ten yards of my tent, which was located on the northern tip of Cotton Key.

Variability of "würdemannii."—In 1858 Baird gave the name *Ardea würdemannii* to an intermediate plumage type taken in Florida Bay. Holt considered this form to be a hybrid between the Great White Heron and the Great Blue Heron. No specimens were col-

lected during my stay in Florida Bay, but my notes on color variation in blue birds show that they are highly variable. All the blue birds observed along U. S. Route 1 between Key Largo and Homestead were dark. Those blue birds which used Dove Creek Slough, northeast of Tavernier on Key Largo, as a feeding area were also dark. The blue birds seen in the censuses (see below) varied from very pale to very dark. Of the three positive blue parents on Cotton Key (see Table 2), two were pale and one was very dark; the dark bird and one of the pale ones had black occipital plumes, but the other pale bird had white plumes. I strongly agree with Robert P. Allen's

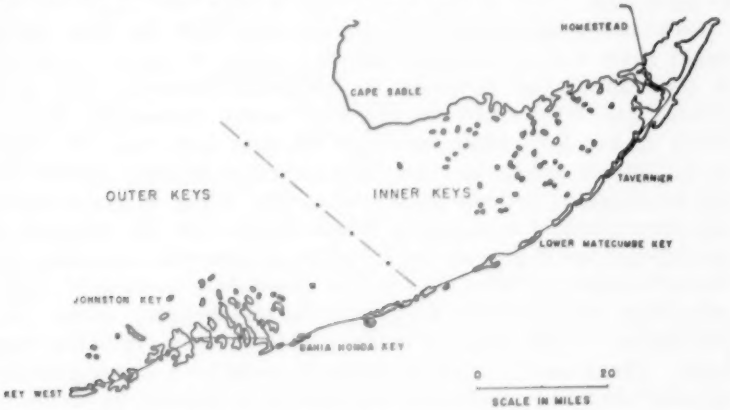

FIGURE 1. Simplified map of the Florida Keys. The broken line arbitrarily divides the keys into an inner group and an outer group.

recollection (Mayr, 1956) that the palest of the blue birds in Florida Bay are found in the outer keys, i.e., those keys west of Bahia Honda Key (see Figure 1).

White : blue ratio censuses.—Although he made no series of counts of white and blue birds, Holt's impressions were that the blues outnumbered the whites in the Cape Sable area of the mainland and on the keys just off Cape Sable, but that whites outnumbered blues on the keys to the south (Barnes, Buchanans, etc.). Greene (1946), working mainly in the outer keys around Key West, made separate counts of white and blue birds, usually on different days in different areas, but on several days both color types were counted in the same area: March 13, 1939, 93 whites, 9 blues (Marquesas Keys); October 21, 1940, 33 whites, 16 blues (Eaglenest, Mud, and Harbor keys, Calda Channel); and November 6, 1940, 55 whites, 20 blues (Calda

Channel). The impression gained from Greene's counts is that whites outnumber blues in the outer keys; however, many additional counts on the same keys in the Key West area are required.

My counts, with few exceptions, were confined to the inner keys of eastern Florida Bay (Bottlepoint, Stake, Low, etc.; see Figure 2). Table 1 lists all censuses taken. In the area shown in Figure 2, the whites outnumbered the blues consistently. These data agree with Holt's impressions for the Barnes-Buchanan area. There may be a clinal increase in the percentage of blue birds as one approaches the mainland, as Mayr (1956) suggests, but many more counts are required to prove this.

Such additional counts, in both the outer and the inner keys, might show a break between the two groups of keys. A glance at the map (Figure 1) reveals an interesting situation—there is a distinct gap, from about the region of Lower Matecumbe Key to Bahia Honda Key, which separates the inner keys from the outer keys. To my knowledge, there are no *Ardea* breeding records for the keys located between these two points. Little is known about the movements of adult Great White Herons and the dispersal of immatures, but if they are as sedentary as generally supposed, the lack of movement across the "Matecumbe-Bahia Honda gap" might effectively split the breeding population of the Great Whites into two distinct populations, one in the outer keys, the other in the inner keys. The available evidence seems to point to a strong gene infiltration from the mainland to the inner keys, with a reduced flow to the outer keys. Such a restricted flow to the outer keys might account for the supposedly greater frequency of very pale "Würdemann" types in the outer keys. However, the meager evidence available in the case of the Great White Heron does not warrant any further speculation.

Evidence for random mating.—A study of mated pairs not only aids in solving the problem of random versus non-random mate selection as far as color type is concerned, but together with an enumeration of their resultant young assists in the construction of genetic models for the inheritance of such color types. Previously published references to mated pairs in the Florida Bay region are, at best, vague and inconclusive. Table 2 summarizes the nesting data gathered during this study. Parentage was established at each nest as follows: a blind was set up near the nest until both parents returned, i.e., perched on the nest rim, fed the young, etc. In the case of nests in which both parents were of the same color type, I

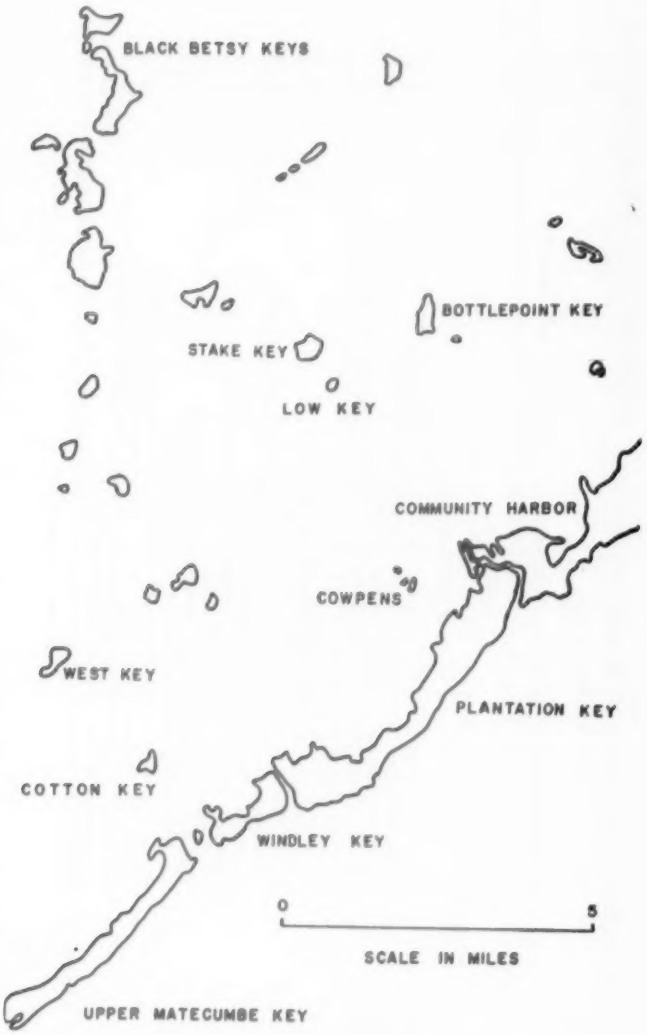

FIGURE 2. Simplified map of a portion of the inner keys. Most of the observations recorded in the text were made in this area.

TABLE 1

CENSUSES SHOWING THE RATIO OF WHITE : BLUE HERONS IN PORTIONS OF FLORIDA BAY

Date	*Census Route*	*Ratio, White : Blue*
	BOTTLEPOINT KEY AREA	
December 10, 1955	Community Harbor-Bottlepoint-Stake-Low-Cowpens-Community Harbor	18 : 2
December 13, 1955	Community Harbor-Cowpens-Tavernier Creek-Community Harbor	2 : 3
December 15, 1955	Community Harbor-Cowpens-Community Harbor	8 : 1
December 18, 1955	Community Harbor-Bottlepoint-Stake-Low-Cowpens-Community Harbor	6 : 1
December 24, 1955	Community Harbor-Cowpens-Tavernier Creek-Community Harbor	3 : 1
December 26, 1955	Community Harbor-Bottlepoint-Community Harbor	4 : 1
December 27, 1955	Community Harbor-Bottlepoint-Community Harbor	4 : 1
December 31, 1955	Community Harbor-Cowpens-Community Harbor	5 : 1
January 2, 1956	Community Harbor-Bottlepoint-Stake-Low-Cowpens-Community Harbor	8 : 0
January 3, 1956	Community Harbor-Cowpens-Community Harbor	5 : 1
January 20, 1956	Community Harbor-Bottlepoint-Cowpens-Community Harbor	7 : 0
January 24, 1956	Community Harbor-Cowpens-Community Harbor	5 : 0
January 25, 1956	Community Harbor-Bottlepoint-Community Harbor	9 : 1
January 28, 1956	Community Harbor-Bottlepoint-Community Harbor	6 : 0
January 31, 1956	Community Harbor-Bottlepoint-Stake-Low-Cowpens-Community Harbor	5 : 0
March 9, 1956	Community Harbor-Bottlepoint-Stake-Low-Cowpens-Community Harbor	26 : 0
April 13, 1956	Community Harbor-Bottlepoint-Stake-Low-Cowpens-Community Harbor	18 : 2
April 14, 1956	Community Harbor-Cowpens-Community Harbor	11 : 2

TABLE 1—*Continued*

Date	*Census Route*	*Ratio, White : Blue*
	JOHNSTON KEY AREA	
January 27, 1956	Perky (Sugarloaf Key)-Johnston-Perky	5 : 8
February 2, 1956	Perky (Sugarloaf Key)-Johnston-Perky	4 : 5
	VICINITY OF TAVERNIER, KEY LARGO	
December 11, 1955	** Dove Creek Slough	0 : 2
December 14, 1955	** Dove Creek Slough	0 : 1
December 21, 1955	** Dove Creek Slough	0 : 2
December 22, 1955	** Dove Creek Slough	0 : 2
	ALONG ROUTE U. S. 1	
December 12, 1955	* Tavernier-Homestead	0 : 3
December 30, 1955	* Tavernier-Homestead	0 : 3
May 20, 1956	* Tavernier-Homestead	0 : 3
February 2, 1956	* Lower Matecumbe-Indian-Upper Matecumbe-Windley-Plantation-Tavernier	9 : 5
	COTTON KEY AREA	
February 6, 1956	Community Harbor-Cowpens-Cotton-West-Community Harbor	12 : 2
February 11, 1956	Cotton	14 : 4
February 20, 1956	Cotton-West	18 : 2
February 23, 1956	Cotton-Windley	23 : 3

* All censuses were taken by boat, except those marked (*), which were taken by car, and those marked (**), which were taken on foot.

required both parents to appear at the nest together. Establishing parentage at *Ardea* nests in Florida Bay is a time-consuming task, and I strongly recommend that future investigators make their counts early in the egg-laying period. From my experience with other ardeids, I have found that at this stage in the breeding cycle, both parents spend considerable time at the nest together.

My data from Cotton Key are the most informative because of the presence of white-white and white-blue pairs. The fact that all blue adults on this key were mated to white birds gives the impression that mate selection on Cotton Key was random. However, three factors should be considered before non-random mating is rejected as a possibility: 1) the sample is small; 2) no blue-blue pairs were found (possibly too few blues were available); and 3) whites far outnumbered blues in the vicinity of Cotton Key (see ratio counts above). The young in the nests of white-blue pairs were at different stages in the nesting cycle, possibly indicating that any one blue bird in the rather brief courtship phase of the cycle had only white birds available in the same phase and capable of reacting to the blue's courtship (factor 3 above). Obviously, more information is required, especially during courtship.

As far as the genetics of color inheritance is concerned, the data in Table 2 neither support nor refute any of Mayr's genetic models. However, nest No. 12 on Cotton Key strongly suggests that white is dominant.

Breeding season.—During the winter of 1955–1956 and the spring of 1956, there was a pronounced difference in breeding time between the white birds of the inner keys and the blue birds of the mainland. Holt noted the same difference in the winter of 1923–1924. However, the fact that mixed blue and white pairs bred at the same time as white-white pairs in Florida Bay argues for the conspecificity of the white and blue birds in the inner keys. In addition, the fact that blue birds in the inner keys bred at the same time as white birds supports the contention that the blue and white birds of the inner keys are conspecific with the blue birds of the mainland; one would expect that if the blue and white birds were of different species, the blue birds in Florida Bay would breed at the same time as the blue birds on the mainland, but this did not take place.

Conclusions and suggestions for future research.—In his summary and conclusions, Holt (1928: 31–32) listed eleven points (six morphological, three behavioral, two distributional) defending his conclusion that the Great White Heron was a distinct species. Two morphological points, whiteness and bill size, were shown to be non-diagnostic by Mayr (1956). In addition, Mayr showed that maritime popula-

TABLE 2

COLOR TYPES OF MATED PAIRS, THEIR YOUNG, AND SURVIVAL OF YOUNG
An asterisk (*) denotes a tiny mangrove island near Johnston Key.

Nest	*Nest Location*	*Parent 1*	*Parent 2*	*Young*	*Survival of Young*
1	Bottlepoint Key	white	white	2 white	all
2	Low Key	white	white	3 white	2 white
3	Low Key	white	suspect white	2 white	1 white
4	Cowpens Cut	white	white	3 white	1 white
5	Cowpens Cut	white	white	2 white	1 white
6	Cotton Key	white	white	3 white	2 white
7	Cotton Key	white	blue	2 white, 1 blue	1 white
8	Cotton Key	white	blue	3 white	2 white
9	Cotton Key	white	suspect blue	2 white	1 white
10	Cotton Key	white	blue	2 blue, 1 white	all
11	Cotton Key	white	suspect white	3 white	2 white
12	Cotton Key	white	almost positive white	1 white, 1 blue	1 blue
13	Cotton Key	white	unknown	2 white	1 white
14	Cotton Key	white	unknown	3 white	2 white
15	Cotton Key	white	unknown	1 white, 1 blue	1 blue
16	Cotton Key	suspect white	unknown	2 white	1 white
17	* Johnston mangrove	blue	blue	2 blue	unknown
18	* Johnston mangrove	blue	suspect blue	2 blue	unknown
19	* Johnston mangrove	white	suspect white	2 white	1 white

tions of the Great Blue Heron are widespread and common, invalidating another of Holt's arguments. On the basis of evidence presented here, I feel that I have effectively eliminated Holt's three behavioral points. My additional data relating to random mating and differences in breeding time add weight to the argument that the Great White and Great Blue herons are conspecific. Although I conclude that the evidence gathered to date favors the view that *occidentalis* and *herodias* are conspecific, I must add that much more information is required before a final decision can be made.

Florida Bay is not an easy area in which to study this problem; one must always reckon with vicissitudes of the weather (hurricanes, sudden squalls, etc). In addition, many keys are isolated by extensive banks (e.g., Dildo Key), rendering them relatively inaccessible. Because of the marine nature of the area, a good knowledge of boat and motor operation is a prerequisite to research. However, many of the keys are accessible, and valuable contributions can be made by thorough white : blue ratio censuses on these keys. The courtship of these birds is still inadequately known; additional information on mate selection is needed, but this problem, like the rest, is a time-consuming affair. The problem of color inheritance remains unsolved; those who have the patience to sit in a blind for hours could secure the necessary data at the appropriate nest, i.e., one in which both parents are of the same color type but the brood is mixed. In short, the problem can be approached from many angles, but the investigator must be aware of the technical difficulties involved.

I would like to acknowledge the great assistance I have had in the field from Robert Porter Allen. Robert Meyerriecks, Charles M. Brookfield, and various field representatives of the U. S. Fish and Wildlife Service were of great help. Professor Ernst Mayr read the manuscript and offered valuable suggestions and criticisms. This study was made during the author's appointment as a Junior Fellow, Society of Fellows, Harvard University.

LITERATURE CITED

BOND, J. 1935. The status of the Great Blue Heron in the West Indies. Auk, 52: 76–77.

GREENE, E. R. 1946. Birds of the Lower Florida Keys. Fla. Acad. Sci., 8: 199–265.

HOLT, E. G. 1928. The status of the Great White Heron (*Ardea occidentalis* Audubon) and Würdemann's Heron (*Ardea würdemannii* Baird). Sci. Publ. Cleveland Mus. Nat. Hist., 1: 1–35, 6 pls.

MAYR, E. 1956. Is the Great White Heron a good species? Auk, 73: 71–77.

Biological Laboratories, Harvard University, Cambridge 38, Massachusetts, September 19, 1956.

THE FUNCTION OF M. DEPRESSOR CAUDAE AND M. CAUDOFEMORALIS IN PIGEONS

BY HARVEY I. FISHER

THE usual method of determining the function of a muscle is by gross dissection and study of attachments. Results of such observations are frequently inconclusive and inaccurate because of differential action of the muscle and synergistic actions of other muscles.

This study was concerned primarily with M. caudofemoralis (Figure 1), which is a particularly difficult muscle to which to assign a function in birds. It is attached at each end to a freely movable part of the skeleton—the caudal vertebrae at one end and the femur at the other.

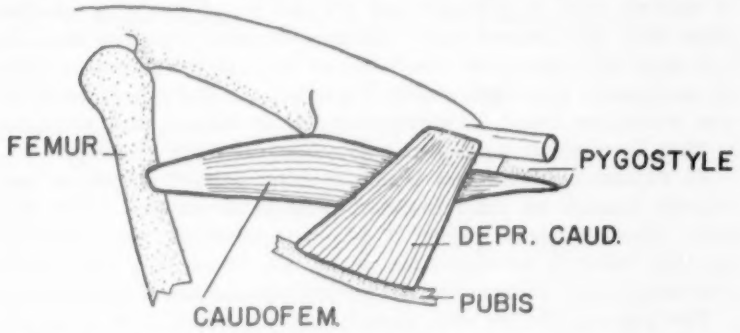

FIGURE 1. Lateral view of M. caudofemoralis and M. depressor caudae in the Domestic Pigeon.

Morphologically, the vertebral attachment is the origin and the femoral end the insertion. However, because of the small size of the muscle and the relative massiveness of the hind limb as compared to the tail, the caudal connection may be the functional insertion, as suggested by Fisher (1946: 666). Contraction of M. caudofemoralis may result in depression of the tail, if bilateral activity of the muscles is involved, or in side-to-side movement of the tail if the muscles act unilaterally.

M. depressor caudae would appear to have two possible actions—depression of the entire tail, especially the lateral rectrices, if the muscles on the two sides contract simultaneously, and tilting of the tail if the muscles act individually. Some spreading of the rectrices may be possible.

Both muscles, because they are attached to the tail, could have an effect on the pattern and force of landing. Depression of the tail

to form an air brake to reduce speed and increase lift, spreading of the rectrices to form a wider surface, and lateral, rudderlike motions are possible results of action by these two muscles.

THE EXPERIMENTS

Valuable information on muscle function may be obtained through complete incapacitation of a muscle. Disability of a muscle can be accomplished by local administration of anesthetic drugs such as procaine, by resection of nerves leading to the muscle, or by resection of the entire muscle.

All three methods were used on Domestic Pigeons (*Columba livia*). Local anesthesia proved impracticable on the small muscles because of varying rates of diffusion and the danger of disabling muscles other than the desired ones. Cutting of nerves proved feasible, but there was always the possibility of incomplete enervation; sites of innervation were individually variable, and multiple innervation was sometimes found. Consequently, most reliance and emphasis in these experiments were on complete removal of the muscle.

M. depressor caudae was removed under general anesthesia and without damage to other muscles, through an incision 0.5 inches long. Five-millimeter pieces of M. caudofemoralis were removed through half-inch incisions; one piece was taken near the caudal attachment and another near the femoral attachment of each muscle.

Two pigeons (one for each muscle) were used in each set of experiments, and the experiments were repeated three times over a period of two years. Thus, four pigeons were used for the study of the function of each muscle. Each pigeon acted as its own control.

The pigeon was first flown through the flight procedure described by Fisher (1956a) and landed on the force-recording platform (Fisher, 1956b). One hundred such control flights were made for four successive weeks to give an average picture of the pattern of landing and the forces exerted by each bird. After the last series of control flights, the designated muscle was disabled and the bird permitted to fly in a 6- by 10-foot cage.

After six weeks the birds were fully recovered from these minor operations, and 100 experimental flights were made in each of three successive weeks to indicate the postoperative patterns and forces.

RESULTS

Depressor caudae.—Pigeons No. 1, 2, 3, and 4 were used in this work. In Table 1 only the data for pigeons 1 and 2 are presented; data for pigeons No. 3 and 4 approximated those for No. 1 in all

regards, and No. 1 is therefore to be considered more typical than No. 2.

Bird No. 1 exhibited learning in its control flights as well as in its experimental flights, as demonstrated by decreased landing force during each day's trials. However, progressive learning from week to week was indicated only in forward forces (called "back" forces in previous papers) where there was a significant decrease between the first and last days in the control and the experimental series.

Bilateral removal of M. depressor caudae in birds No. 1, 3, and 4 resulted in a statistically significant increase of 40 to 60 per cent in forward force of landing between the last control and the first ex-

TABLE 1

AVERAGE FORCES (IN MM.) OF 100 LANDINGS BY DOMESTIC PIGEONS

Pigeon number	*Control, trial days*				*Experimental, trial days*		
	1	*2*	*3*	*4*	*1*	*2*	*3*
				forward			
1	9.6	10.4	8.9	8.2	12.5	8.3	11.1
2	8.5	7.6	9.1	8.8	10.5	8.6	9.7
5	9.2	9.4	7.1	7.5	9.0	7.4	9.2
6	12.9	12.5	11.2	11.3	11.9	10.9	11.4
				downward			
1	8.9	10.7	8.9	9.4	8.1	10.2	8.9
2	7.7	7.5	7.9	8.2	6.9	7.8	8.4
5	12.2	9.1	8.5	8.7	8.8	7.7	8.6
6	13.7	11.2	10.8	10.8	11.3	11.3	10.0
				total			
1	27.3	31.8	26.0	27.3	28.7	26.8	29.0
2	23.9	22.6	24.8	25.3	22.7	24.3	26.6
5	33.5	27.6	24.2	24.8	26.5	23.9	26.4
6	40.3	34.8	32.7	32.8	34.5	33.5	31.3

perimental series (Table 1). Futhermore, this increased force was a constant feature of the postoperative series of flights (Figure 2). Conversion of the data in millimeters to data in grams is possible by use of the calibration curve given by Fisher (1956b: 338).

Downward forces in these same birds were not significantly changed by the operations. In Figure 2 the apparent postoperative decrease early in the experimental flights is not significant.

Total forces were nearly identical in the control and experimental series, despite the increased forward forces. This is possible because downward force usually constitutes a major portion (approximately two thirds) of the total force.

Bird No. 2 exhibited patterns of behavior and landing forces not found in any other bird of the total of 26 used in these and similar experiments. The pattern of its approach to the landing platform

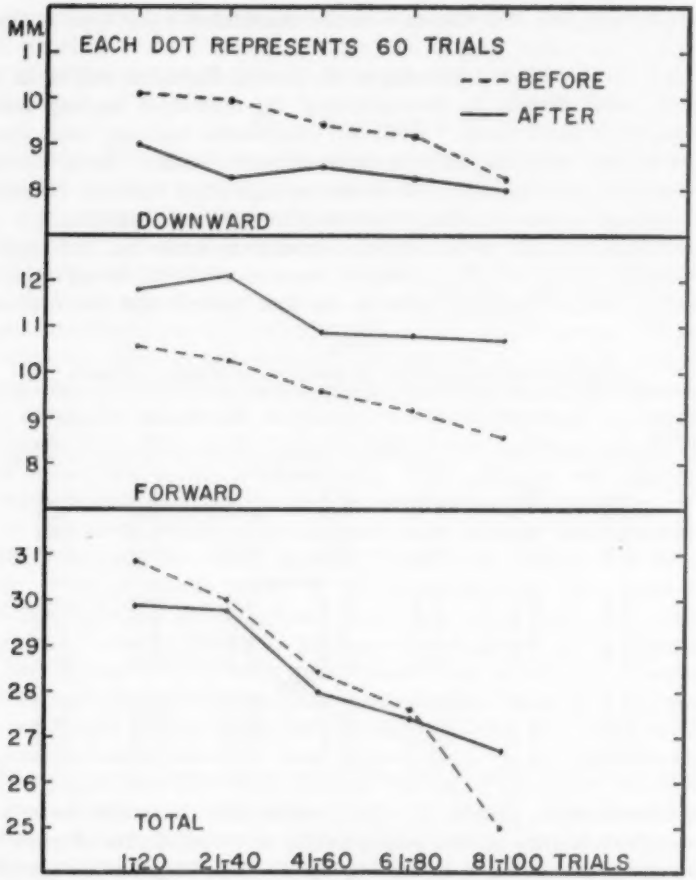

FIGURE 2. Forces of landing (mm.) before and after removal of both Mm. depressor caudae in Domestic Pigeons.

was inconstant from day to day. Although the forces of landing decreased somewhat during each day's trials, the bird showed no decrease from day to day in either the control or the experimental series. Pre- and postoperative forces were the same except for forward force, which was somewhat increased ($P = 0.05$) by the removal of the M. depressor caudae.

Autopsy of these four birds one week after the last experimental landings showed identical and complete extirpation of the designated muscles, with no adhesions.

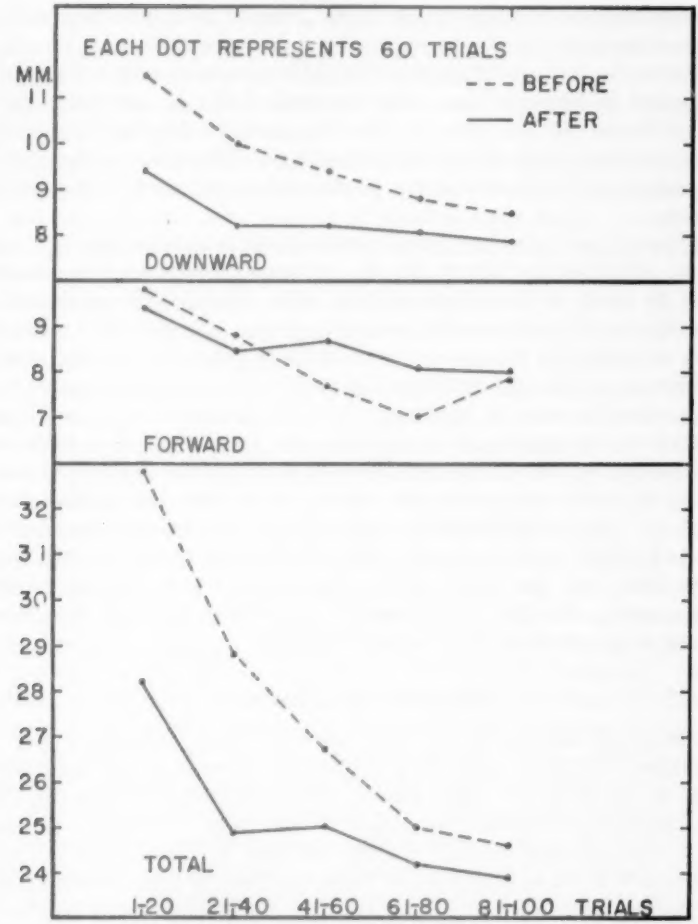

FIGURE 3. Forces of landing (mm.) before and after both Mm. caudofemoralis were disabled in Domestic Pigeons.

Caudofemoralis.—Pigeons 5, 6, 7, and 8 were used in this part of the study. Data for bird No. 5 are presented in Table 1 as indicating the typical forces in this series of experiments. All these birds showed decreased forces during the flights made each day in the control and the experimental series; the forces of No. 6 exhibited the least decrease.

All four birds displayed decreases from day to day during the

control series of landings (Table 1), but none of them gave any indication of such day-to-day decreases in the postoperative series.

Birds No. 5, 7, and 8 exhibited slight but variable and insignificant increases in forward forces after removal of the M. caudofemoralis. Other forces did not increase after the expected decrease during the first or second week of the control landings. There was no significant change in any force used by No. 6, after the second week of the control series.

Figure 3 presents the typical trends of forces of birds No. 5, 7, and 8, as exhibited by pigeon No. 5. Average downward force in the first 40 trials of each postoperative series was actually significantly less than during comparable control landings; this is further reflected and magnified in the curves for total force. Average forward forces exhibited no changes between comparable parts of the control and experimental series of landings. It is important to note in Figure 3 that the average forces used during the last 20 trials on each day of the control and of the experimental landings are nearly identical.

Birds 5 to 8 were autopsied within a week after the postoperative flights. Mm. caudofemoralis were almost completely atrophied in Nos. 5 and 7; in Nos. 6 and 8 the attachments of the muscles were atrophied, but the bellies of the muscles were only slightly smaller than usual. In these two birds it was evident that the blood and nerve supply had not been badly disturbed.

Discussion and Summary

Increased landing forces, postoperative, would indicate a loss of function, and they could be presumed to result from the operation. The increased forces might indicate the part that a muscle plays in accomplishing a certain movement of the body. However, because it is apparent that several muscles contract to depress the tail and because it is likely that none of these contract to their fullest extent in normal landings, loss of one muscle's contribution may be partly or completely compensated for by other muscles. Increased forces, therefore, can be interpreted only as indicating that the disabled muscle was a part of the mechanism for depression of the tail or abduction of the rectrices to widen the tail surface. Absence of any change in forces after disablement might indicate no function in the movement tested for, or complete compensation.

Removal of Mm. depressor caudae in four birds caused a significant increase (40 to 60 per cent) in forward or braking forces as the birds landed on the platform. This probably resulted from decreased ability to depress the tail to form a more effective airbrake. Further,

the position of M. depressor caudae indicates that it could have an abducting effect on the rectrices. Close observation of experimental birds indicated that the tail was not as broadly fanned out as before removal of the muscles, although there was no way to measure separately this loss of function.

Depression of the tail to form air flaps would be expected to increase lift, as well as to slow forward motion. The absence of any increase in downward forces, after removal of these muscles, seems to indicate that in pigeons, at least, normal depression of the tail primarily affects forward motion. This is not unexpected, for it is well known that when the angle of incidence of a surface of a moving object is greater than about 60 degrees, lift decreases sharply or disappears, leaving only a slowing or braking effect. In the control landings the tail of the pigeon was usually held downward more than 60 degrees from the line of flight. Postoperatively, the tail was not depressed to such an extent. Thus, it seems that decreased depression of the tail in the pigeon may actually decrease the downward force of landing, by increasing the lift vector, as was insignificantly indicated after removal of Mm. depressor caudae but was demonstrated at a statistically significant level after the Mm. caudofemoralis were incapacitated.

Disabling of Mm. caudofemoralis by removing five-millimeter sections at each end of the muscle resulted in no significant increases in the forces of landing. Further, other than slightly less depression of the tail, no changes in manner of landing were observed. One indication that these muscles function in landing was that the birds showed no day-to-day decrease in forces after the operation although they showed (as did all other birds used in similar experiments) expected decreases in preoperative control flights. The absence of any day-to-day decrease in forces after the muscular action was disturbed would seem to indicate a disruption of the normal pattern. The postoperative decrease in downward forces has already been discussed. It further seems apparent that any function the caudofemoralis muscles have in moving the tail, when a bird lands, is relatively so minor that it is easily and largely compensated for by other muscles.

ACKNOWLEDGMENTS

Mrs. Doris Krull Thomson, at the time of this work an undergraduate student, aided greatly in the first half of these experiments during 1955. The author wishes to thank her for her interest and help. The Research Council of the Graduate School of Southern Illinois University supported this work as part of a continuing study of functional anatomy in birds.

LITERATURE CITED

FISHER, H. I. 1946. Adaptations and comparative anatomy of the locomotor apparatus of New World vultures. Amer. Midl. Nat., **35**: 545–727.

FISHER, H. I. 1956a. The landing forces of domestic pigeons. Auk, **73**: 85–105.

FISHER, H. I. 1956b. Apparatus to measure forces involved in the landing and taking off of birds. Amer. Midl. Nat., **55**: 334–342.

Department of Zoology, Southern Illinois University, Carbondale, Illinois, October 22, 1956.

RADIOIODINE: A METHOD FOR MEASURING THYROID ACTIVITY

BY BARBARA A. FINK

THIS paper describes a method for measuring the uptake and retention of iodine 131 in the thyroid glands of living birds. It is hoped that this method may prove useful in determining annual cycles of thyroid activity. A preliminary investigation of the relationship between the level of radioiodine in the blood and in the thyroid glands at various intervals after injection was also begun at this time.

Materials and Methods.—The 16 birds used in the tests—2 White-crowned Sparrows (*Zonotrichia leucophrys pugetensis* and *Z. l. gambeli*) and 14 Brown Towhees (*Pipilo fuscus*)—were trapped as needed in the Santa Barbara area. They were weighed, banded, and put in a large cage prior to being injected with radioiodine. Plain canary seed, young grasses, and water were kept constantly before the birds. To allow the birds to adjust to their new surroundings, they were held a minimum of 4 days prior to being injected. The birds in the third series of tests were held almost 16 days, because of an unforseeable delay. Upon completion of a test-series, the birds were aged, weighed, and set free. Determinations of sex could not be made, since males and females look alike in both species.

Iodine 131 was diluted in 0.9 per cent saline solution to a concentration of 5 microcuries (μc) iodine per 0.25 cc. saline. This solution was then injected into the posterior margin of the right *pectoralis* muscle of the bird. All materials and equipment were sterilized before injection.

Radioactivity was determined by means of a P-20A Scintillation Detector tube containing a gamma crystal. The counts were recorded by a "Tracerlab" scaling device. The counts of radioactivity taken at any one time were recorded in such quantity or for such a period of time as to insure a margin of error of less than 1 per cent. Since mechanically the scaling device is unable to record all counts of radioactivity above 15,000 counts per minute (CPM), the number missed being in direct proportion to the increase in radioactivity above this level, readings higher than this may be corrected by the "split source" method. The readings in this paper have not been so corrected, however, as the mere presence of a high peak was sufficient. Extensive quantitative analyses are beyond the scope of this paper.

The Scintillation Detector was housed in a lead, shot-filled casing, and rested on a circular, lead chamber-house which had a hole in the top to accommodate the crystal face of the Detector. Since it was

necessary to make the two-inch diameter of the Detector face smaller, so as to be able to localize the area of the thyroid glands under the apparatus, a lead block containing a hole of 0.8 cm. diameter was used directly below the hole in the chamber-house.

A system of two correlated graphs was used to facilitate the location of any given area of the bird under the Scintillation tube. These graphs were aligned to an accuracy of 0.2 sq. cm. The effectiveness of the lead block, the accuracy of the graphs, and the general dependability of the equipment were rechecked by means of a gelatin phantom injected with amounts of iodine 131 comparable to those introduced into the birds tested.

The exact location of the thyroid glands with respect to the "outside topography" of the birds was determined by a sample dissection. This area was put under the hole in the lead block, and thus under the Detector, and the bird was moved slightly back and forth under the apparatus so as to obtain the highest possible reading of radioactivity. It was then assumed that a true reading of the thyroid area was being recorded.

The bird was held under the Scintillation Detector by means of a specially constructed bird-box, fitted with foam rubber and having a plastic lid. Levers in the box enabled the breast region of the bird to be pressed tightly against the plastic cover. Blood samples, taken from a wing vein, were put in a special plastic holder which fitted on top of the lead block.

All readings of radioactivity are recorded and corrected to "no decay," thus compensating for the decrease in radioactivity readings during the tests, due to the half-life disintegration of the iodine. All of the birds lost weight slightly, probably owing to the rigors of capture and confinement.

Tests.—The first series of tests, Series 1 (Figure 1), was started on April 5, 1956. Five μc's of iodine 131—an amount comparable to that used in Oregon Juncos by Bailey (1953)—were injected into each of two mature White-crowned Sparrows of similar weight, at 8:00 A.M. The radioactivity of the thyroid area was tested one-half

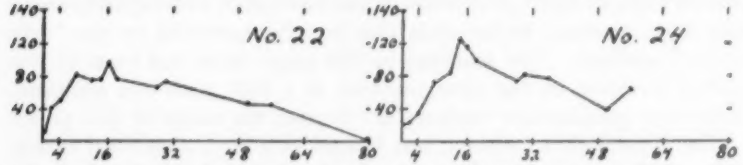

FIGURE 1. Radioactivity of the thyroid areas of 2 White-crowned Sparrows. CPM × 100, ordinate; hours after injection, abscissa.

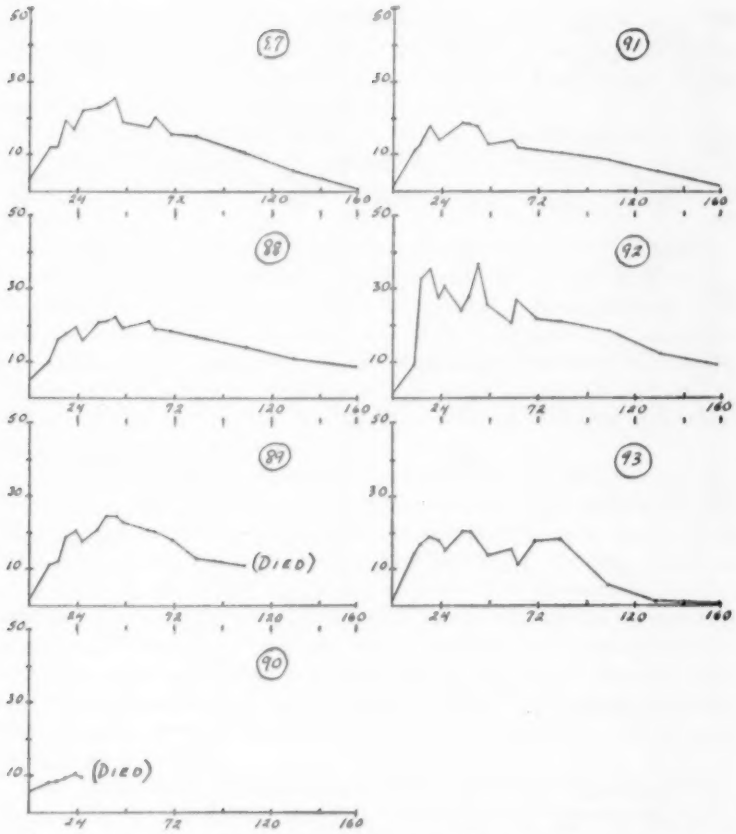

FIGURE 2. Radioactivity of the thyroid areas of 7 Brown Towhees. CPM × 1000, ordinate; hours after injection, abscissa.

hour after injection and at given intervals thereafter. Testing was discontinued at 80 hours after injection when the level of radioactivity was lower than the base rate obtained one-half hour after injection.

Since some preliminary results with blood levels of radioactivity indicated that a dose of 5 μc. was too small an amount with which to obtain readings of sufficient height to be distinguished from the background reading, it was decided to inject an increased amount of radioiodine into the birds of the next series. It was expected that towhees, which were to be used in place of the already migrating White-crowned Sparrows, could probably handle it without harmful effects.

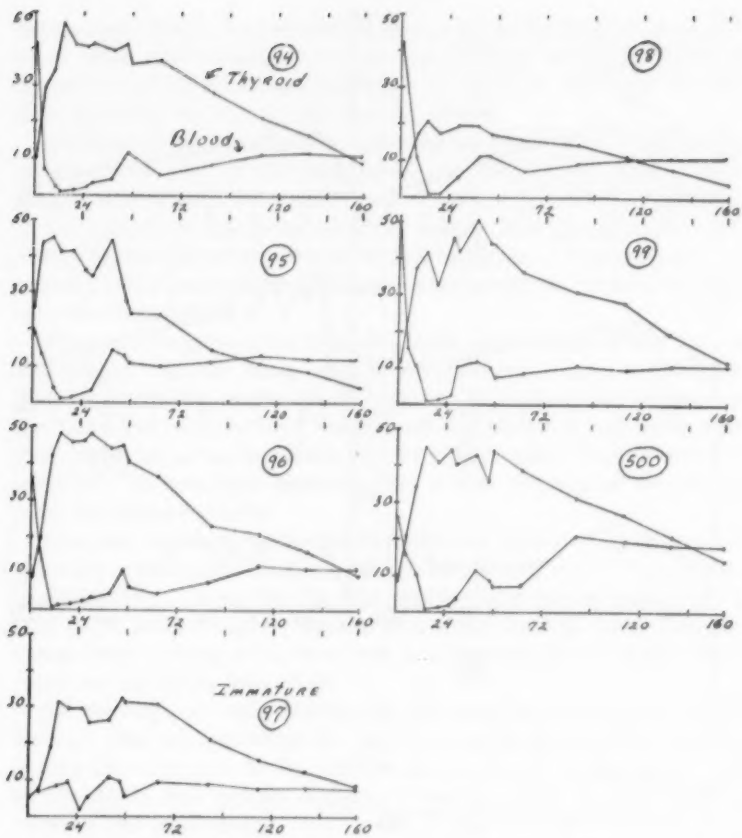

FIGURE 3. Radioactivity of thyroid areas and blood samples of 7 Brown Towhees. CPM × 1000 for the thyroid areas and CPM × 10 for the blood samples, ordinate; hours after injection, abscissa.

Accordingly, on May 4, 1956, Series 2 (Figure 2) was started, using 7 mature Brown Towhees which were injected with 10 μc. each at 9:30 P.M. The birds were aged by observation by Dr. M. M. Erickson. The radioactivity of the thyroid area was tested one-half hour after injection and at given intervals thereafter. Testing was discontinued 160 hours later. There were two casualties. No blood readings were taken.

Series 3 (Figure 3) was begun on May 28, 1956, at 7:00 P.M. A group of Brown Towhees, consisting of 6 mature individuals and

one immature, was injected with 10 μc. portions of radioiodine. The birds were aged by examination of the skull as described by Miller (1946). Testing was discontinued 159 hours after injection. Blood readings were taken. There were no casualties.

Results (summarized in Figures 1–3).—Both White-crowned Sparrows reached a peak of radioactivity in the thyroid areas 14 to 16 hours after injection. This activity declined gradually until the end of testing.

In combining the results of the two test-series on the towhees, it was found that 10 birds reached a peak of radioactivity in the thyroid area 17 to 18 hours after injections; 2 birds reached peak activity 22 hours after injection; one, after 13 hours; and one never reached much of a peak and died 34 hours after injection. From the above results, it can be seen that on the whole, the towhees attained a peak of radioactivity in the thyroid area some 2 hours later than did the sparrows.

After the initial rise, fluctuations occurred in the level of radioactivity in the thyroid area until approximately 43 hours after injection. Fluctuations in certain individuals also occurred from 59 to 83 hours after injection. Whether the fluctuations during the first 43 hours were brought about by the close spacing of the test intervals, and whether they might have shown up during the period of gradual decline had that part of the test been conducted also with such intervals, cannot be conclusively determined at this time. The fact that such fluctuations were found in Series 2, where the intervals between tests from 59 to 83 hours were shorter than in Series 3, would seem to support this idea.

The blood level of radioactivity shows a sharp initial drop corresponding to the initial rise in radioactivity in the thyroid area. After a period of low activity, the level rises rather sharply to a small peak, drops off again, and rises gradually over the hours to a point where it begins to level off. The only deviation from this general pattern is that of one immature bird, No. 97 (Figure 3), where the initial drop is interrupted by a small rise in radioactivity.

The thyroid and blood curves may be summarized as follows: From 0 to 17 hours after injection there is a continuing rise in the level of radioactivity of the thyroid area, as the glands assimilate the radioiodine from the bloodstream. Correspondingly, the blood level of radioiodine drops. This is followed by a period in which the thyroid level of radioiodine is relatively high and the blood level is relatively low. At 39 to 43 hours, we observe what is probably evidence of the first appreciable secretion of radioiodine from the

thyroid back into the bloodstream. In some cases, this is followed by a corresponding drop in the level of radioiodine in the thyroid area. After approximately 43 hours, the thyroid level of radioiodine gradually drops off, accompanied by a gradual rise and leveling off of the amount of radioiodine in the blood.

Discussion.—Even with the limits placed on the accuracy of the number of counts per minute, it is evident that the birds in Series 3 possessed radioactivity records much higher than those of Series 2. This may be an expression of 1) some phase of a seasonal fluctuation; 2) individual variability; or 3) a difference in the length of time the birds were held before injection. Since the figures in this report have not been scaled to allow for seasonal changes, it is not known whether a difference of 20,000 CPM would represent a small fluctuation or one so large that it would exclude this first possibility. The overlap indicated in the records of birds No. 92 and No. 98 suggests the second possibility. However, the chance that two groups selected at random would have a mean difference of the magnitude obtained would seem to be rather small. Further work will be necessary to clear up the questions raised by these three points.

Mature and Immature Birds.—There appears to be no appreciable difference in records between immature and mature birds, except for the minor difference in blood curves, noted above.

Advantage and Disadvantages of this Method.—The present method of recording the uptake and retention of iodine 131 permits the birds tested to remain alive, and thus the cycle of thyroid activity could be charted for the same bird throughout the year—a procedure that has formerly been impossible. The method also provides a more detailed scale of measurements for quantitative analyses of thyroid activity.

One possible disadvantage of this method may be the effects of capture on the activity of the thyroids of the birds tested.

Acknowledgements.—I am deeply indebted to Dr. Mary M. Erickson for suggesting this problem, giving continuous aid with techniques, and offering encouragement throughout the course of the work. She also read and criticized the manuscript. I wish also to thank Dr. Barbara B. Oakeson for reading and criticizing the manuscript, and Dr. Charles G. Miller, who designed and built some of the equipment and instructed me in the use of the Scintillation Counter and Scaler.

SUMMARY

White-crowned Sparrows and Brown Towhees were injected with iodine 131 and the radioactivity of the thyroid area was measured,

as well as the radioactivity of blood samples of 7 of the towhees, at given intervals after injection. All measurements were made on living birds. Peak radioactivity occurred in the thyroid area of the majority of the towhees about 17 hours after injection, at a time corresponding to the lowest level of radioactivity in the blood. Peak radioactivity occurred in the white-crowns some 2 hours earlier. There appeared to be no appreciable difference between the records of mature and immature individuals. The quantitative aspects of radioactivity records are briefly discussed. Advantages and applications of this method of measurement of live birds are also presented.

LITERATURE CITED

BAILEY, R. E. 1953. Radiosurgery and uptake of radioactive iodine by the thyroid of the Oregon Junco. Auk, **70**: 196–199.

MILLER, A. H. 1946. A method of aging live passerine birds. Bird-Banding, **17**: 33–35.

Dept. of Biological Sciences, University of California, Santa Barbara College, Goleta, California, August 24, 1956.

GENERAL NOTES

Observations on Gnatcatcher range extension.—For the past half-century the increasingly frequent occurrence of the Blue-gray Gnatcatcher (*Polioptila caerulea*) in areas north of the Mason-Dixon Line has been reported as being of special interest. For example, Saunders (Auk, **67**: 255: 1950) reports the species nesting in Connecticut and states that it suddenly became common in the spring of 1947. Baillie and Harrington (Trans. Roy. Can. Inst., **21**, Pt. 2: 233–234, 1937) cite numerous breeding records for Ontario. Schorger (Auk, **67**: 394, 1950) reports the collection of one of "a pair" (believed to be breeding residents) in Sawyer County, Wisconsin in 1949. I have spent many hours, since 1947, studying the Blue-gray Gnatcatcher in various parts of eastern United States and Cuba, and have been intrigued by its distributional patterns. In the North all reports and my own observations indicate that gnatcatchers occur along wooded rivers, creeks, or other bodies of water. In the South the species is not thus confined. Further, some northern stream sites which appear perfectly suitable have few or no birds, while others support comparatively many.

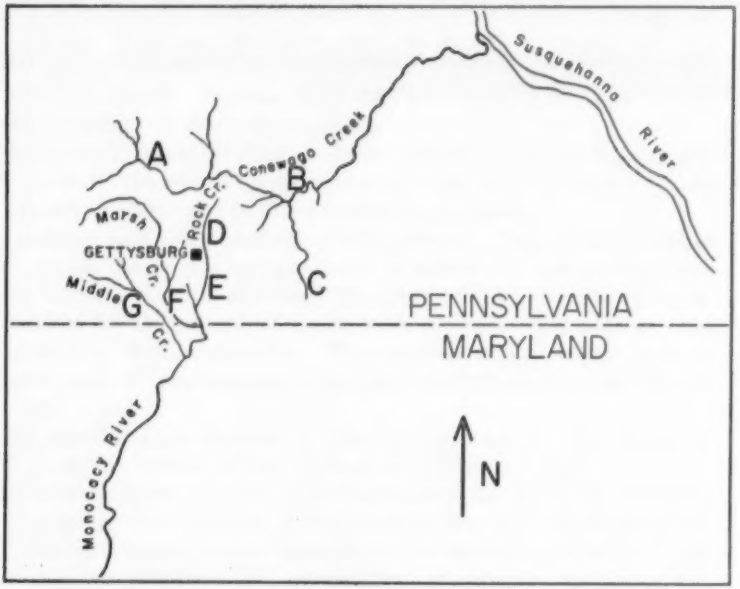

FIGURE 1. Parts of the Susquehanna and Potomac river drainage systems showing the location of areas A-G on which gnatcatcher censuses were taken.

A linear census taken along tributaries of two drainage systems in Adams County, Pennsylvania, has yielded some interesting data, which I believe may help explain some of the puzzling distributional aspects in the North. The census covered a period of three years, 1951–1953, and was taken in seven localities within 14 miles of Gettysburg (Figure 1), each presenting what I believe to be adequate ecological

requirements. All counts were confined to a period from May 1 to June 15. The census was accomplished by walking along the creeks and noting the number and location of calling birds. Two or three counts were made each season, and only the largest was used. No special effort was made to locate all nests, although a sufficient number was located to justify considering calling birds as breeding birds. Only one pair was assumed to occupy an immediate area. Generally about 500 to 600 yards separated the closer nests. In one instance, on Area F in 1953, two nests were situated about 75 yards apart but on opposite sides of a widened portion of Marsh Creek. The possibility that a pair might be counted twice while carrying nesting materials from one nest site to another was minimized, for, although gnatcatchers frequently do tear down one nest to use in building another, the second site is rarely more than 25 to 50 yards from the first.

The results of the census are summarized in Table 1. In the Susquehanna drainage system, three counts were made, on the Conewago Creek and its South Branch tributary, on areas totalling approximately 6.6 miles in length. One plot, Area C, extends well south of two of the areas on the Potomac drainage system. In three years only four pairs of gnatcatchers were counted here. Four areas, two on Rock Creek, one on Marsh Creek, and one on Middle Creek, were examined for two or three years. These creeks empty into the Monocacy River, a major tributary of the Potomac drainage system. The three-year cumulative total on the 7.3 miles censused here was 69 pairs. The year 1953 saw a major increase over 1951 and 1952 in the Blue-gray Gnatcatcher population in this area. A few spot checks made in 1954 indicated no appreciable change over 1953. During 1953 and 1954 I noted a number of gnatcatchers in areas up to three miles from the nearest creek, in open woodlands.

The major difference between the two drainage systems in this area is that Conewago Creek drains to the northeast into the Susquehanna, whereas the tributaries of the Monocacy River drain generally southward into the Potomac. It is my hypothesis that Blue-gray Gnatcatchers migrate northward principally along the

TABLE 1

SUMMARY OF RESULTS OF CENSUS OF BLUE-GRAY GNATCATCHERS ON SEVEN AREAS ON TWO DRAINAGE SYSTEMS IN ADAMS COUNTY, PENNSYLVANIA, IN 1951, 1952, 1953

Area	*Drainage system*	*Length of area (miles)*	*Gnatcatchers (pairs)*		
			1951	*1952*	*1953*
A	Susquehanna	2.0	0	0	0
B	Susquehanna	2.1	0	0	1
C	Susquehanna	2.5	0	1	2
D	Potomac	1.0	—	1	4
E	Potomac	1.2	1	2	5
F	Potomac	3.0	9	9	23
G	Potomac	2.1	—	4	11

major rivers and their tributaries. A few may bridge the higher lands from one system to another. However, they do not reverse their northward direction to follow a tributary which would lead them southward. This would explain their more common occurrence along waterways in the northern portion of their range, and their non-occurrence along some streams. These conclusions would imply some sensory ability (perhaps the "astronomical analyser" of Kramer [Ibis, **94**: 265–285, 1952] and other European authors) on the part of this species to orient

itself with respect to north-south direction. Topographic features would not prevent a reversal in direction.—GEORGE E. GRUBE, *State Teachers College, Lock Haven, Pennsylvania.*

Incubation Period of the Sora Rail.—I have previously listed (Wilson Bull., 47: 79–80, 1935) several records of incubation periods of the Sora Rail (*Porzana carolina*) as 16 and 17 days, with the possibility that some required two to three days longer. These periods were: (1) May 15 to 31, 1920, or 16 days; (2) May 17 to June 3, 1930, or 17 days; (3) May 12 (last egg laid) to May 27, 1934, when 4 eggs were hatched (5 eggs still unhatched), or a period of at least 17 to 18 days. Several other nests were found where incubation periods were also checked and published (Auk, 57: 157, 161, 1940). In one nest the last egg was laid on May 25, 1935 and hatched on June 9, 15 days later. The period in another nest was from May 17 to June 5, 1938, or 19 days. In another, it was from May 28 to June 12, 1938, when the last eggs were deserted; incubation began on May 23, when the eighth egg was laid. This egg required 19 days to hatch.

During May, 1948, I had the good fortune to find 4 other nests. The first was discovered on May 15, with a full complement of 10 eggs. On June 3 at 5 A.M. all 10 eggs were hatched, giving an incubation period of at least 19 days. On May 22, the eggs averaged 7.96 grams in weight and 30.34 (29–31.4) × 23.07 (22.3–23.6) mm. in size.

In the second nest there were 4 eggs on May 15, and the tenth egg was laid May 21. On June 3 at 5 A.M. there was 1 young; at 7 A.M., 2 young; at 8 P.M., 4 young. On June 5 at 2 P.M. there were 7 young; on June 6 at 9:30 A.M., 8 young; and the same on June 8 at 7:30 A.M. Two eggs did not hatch. Incubation required at least 17 or 18 days. On May 22, the eggs averaged 8.84 grams in weight and measured 30.99 (29.9–31.7) × 23.26 (23–23.7) mm.

In the third nest, found on May 15, the eighth egg was laid May 16. On June 3 this nest contained 6 young, 1 egg and 1 infertile egg. The eighth egg hatched June 4, with an incubation period of 19 days. The 8 eggs averaged 7.9 grams in weight and 32.65 (31.5–34) × 22.83 (22–24.1) mm. in measurements.

In the fourth nest, found on May 15, 1948, at 5 P.M. with 5 eggs, there were 8 eggs on May 17 at 7 P.M. Ten eggs were laid. On June 3 there was 1 young at both 5 and 7 A.M., and 4 young at 8 P.M. On June 5 at 2 P.M. there were 6 young. This female deserted the other 4 eggs because of my visits. However, the sixth egg required 20 days to hatch. The 10 eggs averaged 8.58 grams in weight and 31.02 (28.7–32.5) × 23.12 (21.7–24.6) mm. in size.

Thus for the four nests, incubation required a period of 18 to 20 days. These nests were in a small marsh only a few acres in size, in Convis Township, Calhoun County, Michigan. The Sora Rail begins incubating her eggs several days prior to the completion of the set; thus they hatch over a period of several days.

The Virginia Rail (*Rallus limicola*) does not begin incubation until the next to the last or last egg is laid. In two nests that I watched in 1935, the eggs hatched 20 days after the last one was laid (Auk, 54: 467–470, 1937). On April 19, 1945, along the west shore of Ackley Lake, Convis Township, Calhoun County, Michigan, I found another nest with 4 eggs. On April 22 there were 7 eggs; on April 26, 9. E. M. Brigham, Jr., visited this nest on May 13 and found the eggs hatching. If we assume that the ninth egg was laid about April 24 and that it hatched May 14, the incubation period would have been 20 days at this nest also.—LAWRENCE H. WALKINSHAW, *1703 Wolverine-Federal Tower, Battle Creek, Michigan.*

The Rediscovery of *Tangavius armenti* (Cabanis).—On December 12, 1956, the National Zoological Park obtained some live birds from a dealer, Lowry Riggs, of Rockville, Maryland, who had just received them from a collector at Leticia, in the Amazonian savannas of extreme southeastern Colombia. Leticia, the capital of the Intendencia del Amazonas, is on the north bank of the Amazon River, not quite 4 kilometers from Tabatinga, Brazil, and is just across the river from the territory of Peru. It is the southernmost tip of Colombia. Among other birds in the shipment was a single, fully adult, male Colombian Red-eyed Cowbird in fine plumage. It had been sent to Riggs together with a good number of the common Shiny Cowbirds (*Molothrus bonariensis*). This is the third known specimen of *Tangavius armenti* and constitutes a rediscovery of the bird, as the last one was taken some time prior to 1866. It also gives us a clue as to the range of the bird, previously thought to be restricted to the Caribbean coastal belt of Colombia, where it has been searched for in vain by several parties.

I have given full accounts of our fragmentary knowledge of this bird in earlier publications (The Cowbirds, 1929, pp. 318–319; Ibis, 1933: 492–494), and more recently Stresemann (Mitth. Zool. Mus. Berlin, 30:, 50–51, 1954) has given a little additional information. It may be of interest to summarize the picture very briefly here. In 1826 Gustav Haeberlin collected 3 specimens, a "♂" and 2 "♀ ♀", on the basis of which Cabanis described the bird as *Molothrus armenti* in 1851 (Museum Heinianum, 1: 192). In 1826 Lichtenstein had written the name *I. armenti* on the three birds, but never published this name, which, therefore, dates from Cabanis, 1851. The bird has since then been referred to as "Arment's" cowbird, because of the patronymic appearance of the specific name, ending in "i," but I was never able to learn who "Arment" was, as Cabanis merely used Lichtenstein's old manuscript name without any further explanation. However, as Dr. Stresemann has pointed out to me, the name *armenti* was not created to commemorate a man, but stems from the Latin word *armentum*, meaning a drove of cattle.

The three examples of this bird sent in by Haeberlin, all apparently immature, were said to have been taken at Cartagena, between January and April, 1826. Of these three, but a single specimen is still extant in the collections of the Berlin museum, and no indication of what may have become of the other two has been found. The unique Berlin specimen may therefore be looked upon as the type of *armenti*. Aside from it, the bird is known from a single adult male said to have come from Savanilla, Colombia, in the G. N. Lawrence collection in the American Museum of Natural History, a skin without further data, but known to have been in Lawrence's possession not later than 1866 when Cassin examined it. At that time Cassin (Proc. Acad. Nat. Sci., Phila., 1866, p. 18) thought that a young bird in his museum, said to have come from Demerara, was also of this form, but many years ago the late Dr. Witmer Stone informed me that no specimen of this cowbird was in the collection in Philadelphia, and that he had no record of one ever having been there.

The adult male, now in the American Museum of Natural History, has the initials J. A. on the label. Some years ago Zimmer suggested that these correspond to those of John Akhurst, and it may well be that Lawrence received his specimen from him. In 1859 the Smithsonian Institution received from Akhurst 7 birds from Savanilla, Colombia (*Gampsonyx, Colinus, Coereba, Todirostrum*, etc.), most of which are still in the collections in Washington. Unfortunately none of them have original field labels or any data other than "Savanilla" and "John Akhurst" on them. However, John Akhurst was not the collector; he was a taxidermist and

dealer in natural history specimens, with a business at 9½ Prospect Street, Brooklyn, N. Y., in the fifth, sixth, and seventh decades of the last century.

In reply to my inquiries, Dr. Stresemann has kindly searched the Haeberlin papers in the archives of the Berlin Museum, and informs me that this young collector landed at Puerto Cabello late in 1825 and sent his first shipment of birds from there. On January 10, 1826, he went to Cartagena, where he waited for Count von Sack, who arrived there on February 5. The Count made a contract with Haeberlin to collect along the Magdalena River from Cartagena to Bogota, on which journey he left Cartagena on April 26. However, some 4 days before starting on the journey, in the course of which he died, Haeberlin sent off to Berlin a consignment of 107 bird skins, all collected at Cartagena. In this shipment were the 3 specimens, on the labels of which Lichtenstein subsequently wrote the name *I. armenti*.

About 5 or 6 years ago Mr. M. A. Carriker was collecting birds in Colombia for the U. S. National Museum and made a special search for this bird in the Cartagena area. He found no sign of it and wondered, as others had done before him, if the localities on Cabanis's and Lawrence's birds were incorrect. Dugand (Caldasia, 4: 637, 1947) was also unable to turn up this species in the northern Colombian coastal area. It would appear now that the true habitat of the bird is the Amazonian savanna country of extreme southern Colombia, and, probably, adjacent areas of Brazil and Peru. There is no reason, however, to think that Haeberlin's specimens came from the interior; the above considerations do raise a question as to whether the bird has deserted the coastal area since Haeberlin's time. A cowbird is not a shy kind of bird that flees from human settlement, and the country around Cartagena is said to be still suitable for it.

This rediscovered bird is a relative, although a well-marked and quite isolated one, of the Red-eyed Cowbird, and may prove to be only a race of that species. Until more is learned of it there is no need to change its status, and it may be kept as a species, *Tangavius armenti* (Cabanis). The bird should no longer be called "Arment's" cowbird; if a common name is needed for it, it may be called the Colombian Red-eyed Cowbird.

This note is published by permission of the Secretary of the Smithsonian Institution.—Herbert Friedmann, *Smithsonian Institution, United States National Museum, Washington 25, D. C.*

Great Black-backed Gull (*Larus marinus*).—On November 24, 1955, on Quoquonsett Pond at Little Compton, R. I., I was watching a flock of about 160 Baldpates 100 yards off shore. Just inside there was a single Ruddy Duck (*Oxyura jamaicensis*), apparently a cripple, winged-tipped three hours before by some gunners. It had escaped by swimming too fast for their retriever. A Great Black-backed Gull flew across the pond. As it approached the flock of Baldpates they all took wing, and the gull made straight for the Ruddy Duck, which dove as it came near. The gull hovered over the spot until the duck came up; it again darted at the Ruddy and forced it to dive. This was repeated 7 or 8 times. The last time just after the Ruddy dove, but was swimming so near the surface that it caused a ripple, the gull lit on the water and grabbed it by the neck, pulled it to the surface, and shook it vigorously, as a terrier shakes a rat, for about 4 minutes. Then, when the Ruddy's struggles ceased, the gull began eating it, apparently biting meat off the breast.

This episode was seen clearly with a 20-power telescope. It seemed that the gull recognized the injured state of the Ruddy Duck, singled it out for attack, and put through a successful campaign.—Stanley Cobb, *34 Fernald Drive, Cambridge, Massachusetts.*

The Juvenal Plumages of the Finch Genera *Atlapetes* and *Pipilo*.—In recent years several ornithologists have been turning their attention toward a long-needed analysis of relationships among certain genera and species of New World emberizine finches. One of the characters which have been employed in some of these studies is the pattern of the juvenal plumage (cf. Storer, 1955, on *Aimophila*). In my recent revision of the races of *Atlapetes brunnei-nucha* (Parkes, 1954), in discussing the close superficial similarity in adult plumage between that species and *Pipilo ocai*, I pointed out that their respective juvenal plumages were quite different. This fact had also been mentioned by Chapman (1923: 258). Neither Chapman nor I actually described the differences between the juvenal plumages of *Atlapetes* and *Pipilo;* I propose to do so in this note. I shall also discuss the evidence afforded by the juvenal plumage in determining the species to be included in the genus *Pipilo*, and describe the hitherto unknown juvenal plumage of *Atlapetes brunnei-nucha apertus* Wetmore.

The basic difference between the juvenal plumages of *Atlapetes* and *Pipilo*, in general, lies in the fact that young *Atlapetes* have essentially the same pattern as the adult, although sometimes differing conspicuously in color, while in young *Pipilo* the adult pattern is much less evident. In some species of *Atlapetes* the underparts of the juvenal plumage are streaked, but the back is *never* streaked. These generalizations are true of both *Atlapetes* (*sensu stricto*) and "*Buarremon*," a genus which I merge with *Atlapetes* in accordance with current practice.

In *Pipilo* the juvenal plumage is definitely streaked both ventrally and dorsally, the streaks being least pronounced in *P. ocai*. In young birds of this genus, the anterior ventral streaking reflects the areas which will be black (or dark brown in the case of some females) in the adult; thus the throat of juvenal *ocai* is buffy yellow (with a few blackish-tipped feathers), contrasting with heavy streaks in the area of the adult's black pectoral band. In the *erythrophthalmus* group, the streaking is continuous from the base of the bill to the pectoral region or beyond, *except* for a median zone of varying width in the throat, corresponding to an area in which the feather-bases are frequently white in adult *erythrophthalmus* (and the entire feathers white in *ocai* × *erythrophthalmus* hybrids). Interestingly enough, the *least* streaking on the throat in this species is exhibited by the juvenal plumage of *P. e. erythrophthalmus* and its close relatives, which are geographically most distant from the white-throated *P. ocai*.

In a recent paper, Sibley (1955) has expressed his belief that the Green-tailed Towhee ("*Chlorura*" *chlorura*) should be assigned to the genus *Pipilo* of the Red-eyed Towhees, while following Davis (1951: 100–102) in casting doubt on the correctness of placing the three species of "Brown Towhees" in this genus. Although comparisons of juvenal plumages were mentioned by neither Davis nor Sibley, this criterion gives added weight to their arguments. The juvenal plumage of *chlorurus* conforms precisely to the *Pipilo* pattern: uniformly streaked above, with no indication of the contrast in color between back and crown of the adult; unstreaked on the throat (which is white in the adult); streaked on the remainder of the underparts, with the markings heaviest across the chest, where the adult has a gray band with a poorly-defined posterior edge. The juvenal plumages of *fuscus* and *aberti*, on the other hand, are quite unlike *Pipilo*. There is no sign of dorsal streaking, and the ventral streaking is rather faint or even virtually absent. In some of the subspecies of *fuscus* (i.e., *senicula*) the throat of the adult is quite heavily streaked, that of the juvenile almost immaculate. The only character in which the juvenal plumage of *fuscus* conforms to the *Pipilo* pattern is exhibited by those subspecies

of *fuscus* in which the adult has a reddish crown contrasting strongly with the dorsum; this contrast is scarcely if at all visible in the young bird (juveniles of *mesoleucus* and *albigula* examined).

The little-known *"Pipilo" albicollis* (= *rutilus* auctorum; see Stresemann, 1954: 91) is a particularly interesting species. Davis (1951: 81), after examining a larger series which included the ten I have before me, considered individual variation in color to be "minor." After allowing for the effects of wear, I would judge the individual variation in ventral coloration to be quite marked. This is manifested particularly in the extent of the orange-buff band on the throat and of the spotting or mottling of the breast. The posterior border of the throat-patch, described by Davis as "a narrow, unbroken dark line," is, in some specimens, not only broken but virtually obsolete. I am not as impressed as was Davis by the "remarkable" similarity in coloration of *albicollis* and *fuscus*. In fact, upon first examining *albicollis* I was immediately reminded of *Melozone kieneri* (excluding, for this discussion, the well-differentiated *M. k. biarcuatum*); further comparison strengthens this impression. Many specimens of *albicollis* show a tendency of the blackish markings of the breast to coalesce in a position corresponding to the black spot of *kieneri*. Except for the head markings, the general coloration of the two species is decidedly similar (dorsum, wings, tail, sides, flanks, crissum). The basic color of the underparts of *albicollis* is white, like *kieneri* and unlike *fuscus*. The orange-buff throat of *albicollis*, although paler, is similar in color to the top and sides of the head of *kieneri*. Particularly striking is the similarity between *albicollis* and *kieneri* in the color and pattern of the under wing-coverts, axillars and alulae. The bend of the wing is conspicuously white in both species, the lesser under wing-coverts blackish with white tips, the median under wing-coverts pale rufous, and the axillars pure white externally, shading to gray medially. In fresh plumage the outer edge of the largest alula feather is sharply white in both *albicollis* and *kieneri*.

Although the adults of *Melozone kieneri* lack the white-tipped median wing-coverts of *albicollis*, juveniles have a buffy suggestion of such markings. This phenomenon, however, is quite common in young birds and is probably of no particular significance in this case.

Only one juvenile specimen of *"Pipilo" albicollis* (Moore Collection 32696) has been available to me for examination; it is possibly the only such museum specimen in existence. This bird, when compared with series of juvenal *Melozone kieneri*, *"Pipilo" aberti*, and various races of *"Pipilo" fuscus*, shows a decided resemblance to the *Melozone*. As previously mentioned, juveniles of *fuscus* and *aberti* completely lack any dorsal streaking or spotting. In juvenal *Melozone kieneri* the crown feathers have black central streaks which expand at the tip. On the dorsum, the central streaks are faint or absent, but the black tips are emphasized, giving the back a barred rather than streaked appearance. The single juvenal *albicollis* shows no streaks on the crown, but a faint barring is visible on the dorsum.

Comparison of the underparts of the juvenal *albicollis* specimen with *Melozone kieneri* of approximately equivalent age shows an even more striking similarity. Unlike *fuscus*, the ventral streaking of which is fine, even, and often faint, juveniles of both *kieneri* and *albicollis* are heavily and unevenly spotted below, except on the throat, which is chiefly white as in adult plumage. The markings on the young *albicollis* are heaviest in the pectoral area corresponding to the black spot of *kieneri*.

It would thus appear that *"Pipilo" albicollis*, judging from skins, may be as closely related to *Melozone kieneri* as to *"Pipilo" fuscus*, in some respects seeming

to link the two. I do not wish to propose any realignment of genera at this time, since evidence of other kinds should be assembled before such a step is taken. I believe, however, that the plumage characters described above, especially those of juveniles, are highly significant.

To return to *Pipilo* proper, Dr. Sibley has pointed out to me in correspondence that the pattern of the post-juvenal molt in *P. erythrophthalmus* is such that all the feathers of the "pectoral band" area are replaced before any new feathers appear on the throat, thus giving the young molting *erythrophthalmus* an appearance somewhat reminiscent of *ocai*. Dr. Sibley believes that this is an indication that the throat and the pectoral band area are under separate genetic control, so that color changes might evolve independently in the two areas, with selection leading to the white throat of *ocai* as opposed to the black (at least black-appearing) throat of *erythrophthalmus*. This molt pattern, by the way, is a further indication that the resemblance between adults of *Pipilo ocai* and *Atlapetes brunnei-nucha* is convergent rather than a matter of close relationship. In the post-juvenal molt of the latter species, new feathers appear scattered indiscriminately in the white throat and black pectoral band areas.

If we are to accept the evidence assembled by Sibley, Davis, and myself that *Pipilo* should include the Green-tailed Towhee but not the "Brown Towhees," it would appear that the pattern of post-juvenal molt to which Dr. Sibley calls our attention is *not* a character of *Pipilo* as a genus. Specimens of *fuscus* and *aberti* which I have examined show a post-juvenal molt pattern similar to that of *erythrophthalmus*, in that a complete band of new feathers appears in the pectoral area before feather replacement starts in the throat. In *chlorurus*, however, a portion of the heavily-streaked pectoral area is the *last* of the underparts to acquire new feathers.

This study was initially prompted by the attempt to clarify the relationship (or rather, lack of close relationship) between *Pipilo ocai* and *Atlapetes brunnei-nucha*, so a more detailed contrasting of the juvenal plumages of these two may be in order. Conforming to the condition typical of their respective genera, juvenal *ocai* shows little or none of the difference in ground color between crown and back exhibited by the adult, while *brunnei-nucha* has the color contrast definitely foreshadowed, though much less pronounced than in the adult. In juvenal *ocai* an apparent color difference between back and crown is caused by a difference in streaking, not in basic ground color. The streaks are more definite on the crown, while on the back the central streak tends to be poorly defined, but expanded into a rather well-marked black tip.

Typical adult *ocai* apparently lack light tips to the greater and median wing-coverts; these are present in adults of the western and Mexican races of *erythrophthalmus* and in the juvenal plumage of *ocai*. They are completely absent in the genus *Atlapetes*.

There is a tendency for the lower mandible of young *Pipilo* to be light-colored, though not the rather bright yellowish often attained by juveniles of *Atlapetes*. The significance of this point in indicating relationship of the two genera is doubtful, however, as this phenomenon occurs in a number of passerines.

At the time I wrote my revision of *Atlapetes brunnei-nucha*, the juvenal plumage of none of the three subspecies which lack the black pectoral band (*inornatus*, *allinornatus*, and *apertus*) had been described. Carnegie Museum has subsequently obtained a series of five adult and three juvenal specimens of *A. b. apertus*, collected by Ernest P. Edwards and Richard E. Tashian at Coyamé, Veracruz, México.

Although the black pectoral band characteristic of adults of the other six subspecies of *brunnei-nucha* is, indeed, absent, its location is marked in *apertus* by dark gray feathers which are white at the tips. Wear or disarrangement of the feathers of this area results in a vaguely banded appearance in the pectoral region.

It will be recalled that, in the juvenal plumage of the banded races of *Atlapetes brunnei-nucha*, the breast and abdomen are heavily streaked with dull olive on a white or dull yellow background. It should be pointed out that Chapman (1923: 248) erred in describing the throat of juvenile *brunnei-nucha* as darker than the remaining underparts; the exact converse tends to be true. There is quite a bit of variation in saturation in juveniles of this species, so that some (lighter) individuals appear more distinctly streaked than others. In juveniles of the banded races, the pectoral band is represented by a poorly-defined unstreaked zone of dull olive between the throat and the streaked portion of the underparts. It is thus interesting to note that the juvenal plumage of *apertus* exhibits exactly the same unstreaked band in the same location; in fact, our juvenile specimens of *apertus* are virtually indistinguishable in color from a juvenile of *A. b. alleni* from Honduras (the only banded race which, like *apertus*, lacks yellow lines at the border of the crown). I would take this as evidence in favor of the banded pattern being the ancestral condition rather than the derived condition as has been suggested by Dr. Wetmore (see Parkes, 1954: 130).

I am indebted to Herbert Friedmann, Robert T. Moore, Charles O'Brien, Robert T. Orr, Frank A. Pitelka, Charles G. Sibley, and Robert W. Storer for lending me pertinent specimens from the collections under their care. Dr. Sibley and Dr. John Davis also provided valuable advice and suggestions.

Literature Cited

Chapman, F. M. 1923. Mutation among birds in the genus *Buarremon*. Bull. Am. Mus. Nat. Hist., **48**: 243–278.

Davis, J. 1951. Distribution and variation of the Brown Towhees. Univ. Calif. Publ. Zool., **52**: 1–120.

Parkes, K. C. 1954. A revision of the neotropical finch *Atlapetes brunnei-nucha*. Condor, **56**: 129–138.

Sibley, C. G. 1955. The generic allocation of the Green-tailed Towhee. Auk, **72**: 420–423.

Storer, R. W. 1955. A preliminary survey of the sparrows of the genus *Aimophila*. Condor, **57**: 193–201.

Stresemann, E. 1954. Ferdinand Deppe's travels in Mexico, 1824–1829. Condor, **56**: 86–92.

—Kenneth C. Parkes, *Carnegie Museum, Pittsburgh 13, Pennsylvania.*

Transplantation of a Shrike Pair.—On April 21, 1956, a pair of Migrant Shrikes (*Lanius ludovicianus*), one of which was carrying nesting material, was trapped and banded in Section 26, T22N, R7E, Wisconsin. They were released 10 miles away in Section 8, T20N, R8E. Their nest was found in Section 17 in the latter township, 9/10 of a mile from the release point and 10¾ miles from the original point of capture. It contained 4 eggs on May 13, 6 eggs on May 25, and 5 young on June 8, at which time both adults were retrapped and their band numbers verified.—Frances Hamerstrom, *Wisconsin Conservation Department, Plainfield, Wisconsin.*

***Lanius ludovicianus miamensis* Bishop, a Valid Race from Southern Florida.**—When A. H. Howell wrote his "Florida Bird Life" in 1932, he recorded only *Lanius ludovicianus ludovicianus* for Florida, with a general distribution throughout the state. In the 1954 edition revised by A. Sprunt, however, three specimens of the more northern subspecies (*L. l. migrans* Palmer) are recorded: one from near Lake City (November 23, 1941), one from north of Okeechobee (March 3, 1936), and one from Merritt Island (March 7, 1936).

However, in 1933, L. B. Bishop described as new a resident subspecies from southern Florida, *L. l. miamensis*, with type locality Cutler, Dade Co. (Proc. Biol. Soc. Wash., 46: 203, 1933). In making a routine check of the type and the series which Bishop used in naming this race, which are in the Chicago Natural History Museum, I found that *miamensis* is a valid race with a limited range in southern Florida, and that, being paler than *L. l. ludovicianus*, it could be confused with *L. l. migrans*.

L. l. miamensis Bishop differs from *L. l. ludovicianus* in being paler above; in having the narrow whitish area on the forehead joining the white superciliary lines more distinct; in having more and clearer white in the scapulars; in having, on the average, wider white tips to the inner secondaries; and in being a clearer white below. In size it is slightly smaller than some populations of *L. l. ludovicianus*.

It differs from *L. l. migrans* in being very slightly paler above; in having the whitish area on the forehead more distinct; in the greater extent of clearer white in the scapulars; in having wider white tips to the inner secondaries; and in being whiter below. In addition it is slightly smaller, the bill averages larger, and the tail is proportionately longer, averaging about the same as the wing rather than distinctly shorter.

The measurements in millimeters of Dade County (topotypical and near topotypical) birds are as follows:

Wing:	males (5), 93–95 (av. 94.2)	females (6), 91–97 (av. 93.8)
Tail:	males (4), 95–99 (av. 96.7)	females (5), 90–97 (av. 93)
Culmen:	males (5), 15–16.5 (av. 15.9)	females (5), 15–16.5 (av. 16.1)

Comparative measurements.—The wing is measured flattened and straightened against the ruler; the tail is measured from the insertion of the central tail feathers to the tip of the longest; the exposed culmen is measured with dividers. The measurements given are averages in millimeters.

L. l. migrans

Maine, Connecticut, and Illinois:

	Wing	*Tail*	*Culmen*
10 males	98.8	93.7	14.6
5 females	99	92	14.7

L. l. ludovicianus

Carolinas, Georgia, Mississippi, Alabama, and Louisiana:

5 males	98.1	96.4	14.7
7 females	96.7	94.7	14.8

Northern Florida:

6 males	98.5	96.1	15.6
9 females	97.6	97.4	15.3

Florida:			
Putnam County			
7 males	97.5	96.5	16
7 females	95.5	95.1	15
Indian River Area			
7 males	98.1	98.1	15.9
5 females	96.6	95.4	15.6
Western Central Florida			
4 males	98	100	15.2
3 females	97	96.6	15.1

L. l. miamensis

Florida:			
Fort Meyers Area			
2 males	97	99.5	16.25
2 females	96	97.5	15.5
3 sex?	96.3	98.6	15.8
Dade and Palm Beach Counties			
2 males	94.5	97	15.7
7 females	94	93.5	15.8

Range.—Southern Florida, north to Jupiter and Fort Meyers area.

Remarks.—The color difference between *ludovicianus* and *migrans* is not great, as Ridgway (Bull. U. S. Natl. Mus., 50, pt. 3: 243, 1904) has pointed out, and in regard to color the southeast Florida birds are more different from *ludovicianus* than is *migrans*. The proportions of *miamensis* are more similar to those of *ludovicianus*, but the tail is still longer, and in the Dade County area the smaller size of the birds is not accompanied by a smaller bill; the length of the bill is about the same as that of the larger north Florida birds. Ridgway (*loc. cit.*) has already recorded that the Florida *ludovicianus* has a slightly larger bill than examples of the same race from farther north.

The pale color characteristic of *miamensis* is most evident in the birds of Dade and Palm Beach counties, where it is correlated with smallest size. The Fort Meyers area birds are slightly darker and slightly larger, but are best included under *miamensis*.

The birds of Indian River, Putnam County, the Gainesville area, and the Tampa area (Anclote) are intermediate. Some specimens are almost as pale as the Dade County *miamensis*, while others are more like the darker north Florida birds. In general, however, these birds are best included with *ludovicianus*.

North Florida birds, from the Santa Rosa area and Amelia Island, are similar to those of Louisiana and Carolina in depth of general color; they have more white in the scapulars and a larger bill, but the difference is not great.

When Bishop described *miamensis*, he compared it with *excubitorides*. Although their ranges do not overlap, the two races are very similar; *miamensis*, however, has less white in the lower rump and upper tail coverts, and the topotypical birds are smaller. Some specimens from the area of intergradation between *migrans* and *excubitorides* are very similar to *miamensis*. However, the small size and the heavy

bill of the Dade County birds should permit positive identification of the southeastern Florida birds.

Though the possibility of migrants from farther north reaching Florida cannot be ignored, the observed characters and their geographical distribution, and the fact that many specimens were taken in February and March when the breeding season is well started (and a few during the summer), support the generally held view that the species is sedentary in Florida. Any identification of the pale northern *migrans*, as a winter visitor, must take into account the existence of the small pale south Florida birds with larger bills and longer tails.

Florida specimens examined, 72, as follows.

L. l. ludovicianus

Northern Florida 30: Santa Rosa, 3; Mary Esther, 4; Amelia Island, 5; Gainsville, 2; Starke, 1; New River, 1; Putnam County, 14.

Central Florida 20: Indian River area, 12 (Wilson, 7; City Point, 1; Eau Gallie, 3; Enterprise, 1); Tampa area, 8 (Grove City, 1; Anclote, 7).

L. l. miamensis

Southern Florida 22: Fort Meyers area, 9 (Punta Rassa, 6; Pine Island, 3); Palm Beach County, 2 (West Jupiter, 1; Lake Worth, 1); Dade County, 11.

A. L. Rand, *Chicago Natural History Museum, Roosevelt Road and Lake Shore Drive, Chicago 5, Illinois.*

The Bahaman Nighthawk (*Chordeiles minor vicinus*) on the Florida Keys.—It was after sundown on June 13, 1949, that my brother Wray H. Nicholson and I heard a new and strange bird-call on Stock Island, at Key West, Florida. The calls came from the salt flats several hundred yards away, and we felt sure this could only be the note of the Cuban Nighthawk (*Chordeiles minor gundlachii*), which had been reported by Earle Greene, who obtained an adult and one young-of-the-year on August 11, 1942.

Upon reaching the spot, we found a nighthawk flying and diving, uttering notes quite unlike those of any other bird known to us. These calls were three-syllabled and sounded to us like "Kick-a-dic," uttered over and over again.

After a quick search of the mud-caked salt flat, Wray flushed the female from her "nest" containing a single, very heavily incubated egg. The egg was collected and later nicely preserved. We thought we had taken the first actual nest and egg of a Cuban Nighthawk ever to have been found in the United States.

We also heard another male of the same species, calling as it flew about 400 yards to the west, and in searching for a nest of this second pair, we flushed another female, but found no nest. We also heard the calls of a Florida Nighthawk (*C. m. chapmani*), as it flew about nearby. It was uttering the calls ("Beap-Beap-Beap") that are so familiar to us, and I assumed that it was the Florida form. I make this cautious comment advisedly, since on the following day, June 14, we flushed the male "Cuban" nighthawk (the mate of the female whose nest we found) from its perch in a low mangrove tree, and just before alighting on a branch of another mangrove tree, it uttered one distinct "Beap" note identical to the call that is commonly used by *C. m. chapmani*. At no time did I hear this "Beap" note uttered by any of the other three "Cuban" nighthawks while flying and diving above the nesting territory, or while perching. Of the various birds that we saw and heard on the Keys, this was the only one that we judged to be in truth a Florida Nighthawk. Unfortunately, we did not make a search for a possible nest. As we spent four days on the Keys, we can only conclude that at least during the 1949 breeding season it was quite rare.

On June 14 we again visited the nest-site of the "Cuban" nighthawk and found her sitting upon the empty "nest" (the egg having been taken) and somewhat reluctant to leave. She was collected. In a small cluster of mangroves growing on the open salt flats several hundred yards from the nest, I flushed the male, which was also obtained for a specimen.

Again in mid-June, 1950, a two-day search of the Florida Keys as far as Key West was made by Wray H. Nicholson, who failed to find a single nighthawk.

In mid-June of 1955, he made a third trip to Key West and on this venture was successful in discovering, on Stock Island, two nests of what he still believed to be Cuban Nighthawks. One nest held a single incubated egg and the second contained a single young that could barely fly. Also, another male was seen and heard calling as it flew about over the Naval Air Base.

At Islamoranda, Upper Matecumbe Key, as he stood outside a motel in the late afternoon, he saw and heard a male "Cuban" nighthawk calling as it flew over the building. His attempts to trail this bird failed. If this was a breeding bird, then its known breeding range has been extended about 90 miles eastward from Key West.

It is noteworthy that each of the three nests we found contained but a single egg or young. Both the eggs collected are smaller and much paler in coloration and markings than the average eggs of *C. m. chapmani*.

In early January, 1956, Dr. Herbert Friedmann carefully looked over the pair of skins obtained on June 14, 1949, which I brought to the National Museum, and we both noted that the museum specimens of the Cuban Nighthawk (*Chordeiles minor gundlachii*) definitely did not match them. Instead, they compared most favorably with the museum skins of the Bahaman subspecies, *Chordeiles minor vicinus*.

I was requested by Dr. Friedmann to leave these two skins with him, in order that Dr. Alexander Wetmore, who was returning from Panama in March, might have the opportunity to examine them and express his opinion as to their identity.

Accordingly I received a letter from Dr. Wetmore, dated March 22, 1956, which I quote in part: "Yesterday I spent most of the day in study of this problem and fully agree that your two birds represent the Bahaman form *Chordeiles minor vicinus*. It has developed under more careful scrutiny that the two specimens taken earlier by Earle Greene were collected August 11, one being in worn plumage and the other an immature of the year, so that neither one was in good feather, which would account for the earlier identification as the Cuban form. This therefore establishes the Bahaman subspecies as the breeding bird of the Florida Keys and eliminates the Cuban race from our list."

Dr. Wetmore has informed me later that the grayer color that separates the Bahaman race from the Cuban could be seen plainly only in our fresh specimens, being obscured by wear in the first two taken; this accounts for the earlier identification. He also informed me that six sets of the Bahaman form from the Bahamas, Haiti, and Puerto Rico, were all of one egg each.

The Bahaman Nighthawk is a very uncommon bird, found breeding on Stock Island in May and June; we saw and heard only one (in mid-June on Upper Matecumbe Key). The three nests which have been found have contained but a single egg or young, the eggs being much smaller and of paler coloration than eggs of the Florida Nighthawk. So far as known, one egg constitutes the set in this bird.

It has unique call-notes, quite unlike those of any other North American nighthawk. Sometimes the male may utter the "Beap" note when disturbed while perching.

Earle Greene was the first ornithologist to discover and collect specimens of this form in the Florida Keys, several years prior to the time of actual discovery of the nest and eggs.

Just how long the Bahaman Nighthawk might have been breeding on the Florida Keys prior to Greene's discovery is unknown. The failure to see or hear the birds in June, 1950, suggests that they may be absent some years.—DONALD J. NICHOLSON, *Royal Purple Citrus Research Nursery, Orlando, Florida.*

The Hybrid Origin of *Chlorophanes purpurascens*.—The unique type in the British Museum was described by Sclater and Salvin (Nomencl. Av. Neotrop., p. 157, 1873). The label reads "e Mus. P. L. Sclater. Date 1872. Hab. Caracas. Athy. Boucard" and bears the British Museum Catalogue number 04.7.31.137. Hellmayr (Field Mus. Nat. Hist., Zool. Ser., 13 [8]: 250, 1935) doubted that the type actually came from Caracas and commented that the type is a trade skin of the "Trinidad" or "Orinoco" make and "shows exactly the same preparation as specimens of *Hylonympha macrocerca* Gould, whose habitat is likewise unknown." Phelps and Phelps (Auk, 65: 62–66, 1948) subsequently reported the rediscovery of *Hylonympha* on the Paria Peninsula of Venezuela, directly across from Trinidad. The most recent allocation of *C. purpurascens* is that of Phelps and Phelps (Bol. Soc. Venez. Ciencias Nat., 72: 202, 1948) who, following a suggestion of Bond (*in litt.*), considered it to be a hybrid between *Chlorophanes spiza* and *Dacnis cayana cayana*.

In July, 1954, I examined and photographed the type in the British Museum and showed it to Alexander Wetmore who pointed out that in certain respects it resembles *Cyanerpes cyaneus*. Further study of the specimen led me to believe that *C. purpurascens* is a hybrid between *Chlorophanes spiza* and *Cyanerpes cyaneus* as Dr. Wetmore suggested. That *C. spiza* is one parental species seems quite clear, and there are two important reasons for favoring *Cyanerpes cyaneus* over *Dacnis cayana* as the other parent. First, the bill of *C. purpurascens* is longer and more slender than that of either *C. spiza* or *D. cayana*. It is, in fact, intermediate in size and shape between those of *C. spiza* and *Cyanerpes cyaneus*. And second, the color of the bird, as suggested by the specific name, is more purple than either *C. spiza* or *D. cayana* but approaches the deep purplish color of *Cyanerpes cyaneus*. The black area on the back, used by Bond (in Phelps and Phelps) as a reason for considering *D. cayana* as one of the parents, is also a character of *Cyanerpes cyaneus*. There is no black on the throat of *C. purpurasceus* (a character of *D. cayana*) nor is there any turquoise on the crown (a character of *C. cyaneus*). The patterns of the crown, nape, and the upper side of the secondaries are very similar to those of *C. spiza*. The dark under tail coverts approach the black of that part of *C. cyaneus*, and the whitish areas on the proximal parts of the remiges, although less well defined than the conspicuous yellow marks of *C. cyaneus*, suggest relationship with that species. The bill is colored like that of *C. spiza* except that the maxilla is entirely black. The feet appear paler than those of *C. spiza* but darker than those of either *D. cayana* or *C. cyaneus*.

While it is still possible that *Chlorophanes purpurascens* is a valid species and remains to be rediscovered in some unexplored area of Venezuela, I believe that because only one specimen has been collected and that specimen is intermediate between two wide-spread, common species, it is best to consider *Chlorophanes purpurascens* an intergeneric hybrid between *Chlorophanes spiza* and *Cyanerpes cyaneus*, at least until further information is forthcoming.—ROBERT W. STORER, *University of Michigan Museum of Zoology, Ann Arbor, Michigan.*

The Yellow-headed Turkey Vulture in Surinam.—In my "List of the birds of Surinam" (Haverschmidt, 1955) I followed Wetmore (1950) in calling the Yellow-headed Turkey Vulture of Surinam *Cathartes burrovianus* Cassin. Prof. Armando Dugand of Barranquilla (Colombia) was kind enough to draw my attention to his two papers (Dugand, 1951, 1952) in which he concluded that two races can be recognized, a smaller (*Cathartes b. burrovianus*) in the northern part and a larger (*Cathartes b. urubutinga*) in the southern part of its range. The measurements of *C. b. burrovianus* are: wing 450–485 mm., tail 194–221 mm., tarsus 50–61 mm.; of *C. b. urubutinga*, wing 487–540 mm., tail 223–280 mm., tarsus 61–68 mm.

More material, however, is needed and opinions still differ in regard to the taxonomic status of these birds, as de Schauensee (1952) prefers to consider *C. burrovianus* and *C. urubutinga* as two different species until more is known about them. In this connection, the measurements (in millimeters) of a small series of the Yellow-headed Turkey Vulture collected in Surinam may be of interest.

Locality and Date	*Sex*	*Wing*	*Tail*	*Tarsus*	*Collection*
Groningen, Sept. 25, 1911	♀	501	265	69	Leiden Museum
Paramaribo, Jan. 15, 1911	?	503	270	75	Leiden Museum
Paramaribo, Jan. 15, 1911	?	505	280	72	Leiden Museum
Republiek, April 11, 1948	?	499	265	66	Leiden Museum
Zanderij, May 8, 1949	♀	502	258	65	Stockholm Museum

From these measurements it is apparent that it is the larger form (or species) which occurs in Surinam and that it must be called either *Cathartes burrovianus urubutinga* or *Cathartes urubutinga*. More material is needed, however, and special attention must be paid to the color of the head in the different parts of its range.

The Yellow-headed Turkey Vulture is not uncommon in Surinam, but is primarily a bird of the forest and the forest-fringed rivers; it is but seldom seen in cultivated open country where *Cathartes aura* is common. I have only one record from the neighborhood of Paramaribo (November 15, 1948); and it was only in the Nickerie District, near the mouth of the Corantijn River in the western part of the country, that I found it more regularly in cultivated open terrain (e.g., March 27, 1946, May 8, 1947, July 10, 1956). On the other hand, I have seen it along all our forest-fringed rivers.

In the field it is easily recognized, since in flight as well as when perched in trees, the head appears distinctly yellowish orange in contrast to the red head of *Cathartes aura*.

I am indebted to Dr. G. C. A. Junge of the Leiden Museum and Count Nils Gyldenstolpe of the Stockholm Museum for providing me with the measurements of the specimens from Surinam in the collections under their care.

LITERATURE CITED

DUGAND, A. 1951. Descubrimiento de *Cathartes burrovianus* Cassin en Colombia. Rev. Acad. Colombiana Cienc. Exact., Fisico-Quimicas y Naturales, 8, No. 30: 154–156.

DUGAND, A. 1952. Observaciones adicionales sobre *Cathartes burrovianus* y *Cathartes urubutinga*. Lozania, 2: 1–4.

HAVERSCHMIDT, F. 1955. List of the birds of Surinam. Publ. Found. Sci. Res. in Surinam and the Netherlands Antilles, Utrecht, No. 13: 35.

DE SCHAUENSEE, R. 1952. The birds of the Republic of Colombia. Caldasia, 5, No. 26: 1149.

WETMORE, A. 1950. The identity of the American Vulture described as *Cathartes burrovianus* by Cassin. Journ. Wash. Acad. Sci., 40, No. 12: 415–417.

F. HAVERSCHMIDT, *P.O. Box 644, Paramaribo, Surinam.*

Eastern Glossy Ibis Nesting in Southeastern Maryland.—On June 25, 1956, Don P. Fankhauser and I investigated a large heron colony of mixed species, on Mills Island in Chincoteague Bay, Worcester County, Maryland. Large numbers of American Egrets (*Casmerodius albus*), Snowy Egrets (*Leucophoyx thula*), Louisiana Herons (*Hydranassa tricolor*), Little Blue Herons (*Florida caerulea*), and Black-crowned Night Herons (*Nycticorax nycticorax*) were found, all nesting in a dense grove of young red cedar (*Juniperus virginiana*). Much to our surprise, the colony also included at least two pairs of the Eastern Glossy Ibis (*Plegadis falcinellus*). Four adults of this species were repeatedly observed flying low overhead and frequently perching in nearby tree-tops. In addition, two young ibis, about three-fourths grown, were found. These two birds, still unable to fly, would hop and flutter among the tree branches whenever they were approached too closely. The large white crown patch and the peculiar barred markings of the bill were especially noticeable on both of the young.

This is the first breeding record for the Eastern Glossy Ibis in Maryland and apparently also represents the fourth breeding locality recorded along the Atlantic coast, north of Florida. In 1940 it was first found breeding in North Carolina, in Brunswick County (Pearson, Brimley, and Brimley, "Birds of North Carolina," Raleigh, 1942 p. 39), and in 1947 the first breeding record for South Carolina was reported in Charleston County (Sprunt and Chamberlain, "South Carolina Bird Life," Columbia, 1949, p. 99). The most northerly breeding record is for Cape May County, New Jersey, where it was found nesting in 1955 by W. B. Wright and Russell Fowler (Audubon Field Notes, 9: 370, 1955). Since all of these occurrences of nesting have been recorded relatively recently, it would appear that the Eastern Glossy Ibis is undergoing a definite and rather rapid northward expansion of its breeding range along the Atlantic Coast.—ROBERT E. STEWART, *Patuxent Research Refuge, Laurel, Maryland.*

Unusual Flight Behavior of Blue and Snow Geese.—The highly erratic, zig-zag courtship flight among duck species is commonplace, yet a courtship flight among geese apparently occurs infrequently, if at all. I witnessed unusual flight behavior of two Blue Geese (*Chen caerulescens*) and one Lesser Snow Goose (*Chen hyperborea*) late in the afternoon on April 7, 1956, while I was observing approximately 30,000 Blue and Snow geese that were loafing and feeding in a cornfield located several miles west of the Sand Lake National Wildlife Refuge, Columbia, South Dakota. This large contingent of birds comprised a part of the spring migration flight.

There was a constant shifting about of geese, with several hundred in the air at all times. At about 5:30 P.M., the three geese, flying in a tight formation, began maneuvering about at a height considerably greater than that of the other birds. These three displayed markedly swift and agile flight within a radius of about one-quarter mile from the main concentration center. One of the two Blue Geese led the trio, with the other two in close pursuit. The flight, which lasted for 20 minutes, appeared to be a frenzied affair, and the Snow Goose made at least one attempt to grasp in its bill the tail feathers of the leading Blue Goose. The other Blue Goose, bringing up the rear, seemed less attentive.

Because of the erratic wheeling tactics and speed employed, the flight bore a striking resemblance to the courtship flight of Pintails (*Anas acuta*). It was terminated when the three birds joined the massed geese on the ground.—RONALD F. LABISKY, *Illinois Natural History Survey, Urbana, Illinois.*

Records of Longevity in Canada Geese.—Two records of longevity in Canada Geese (*Branta canadensis*) were secured from banded birds killed during the 1955 waterfowl hunting season on the Swan Creek Wildlife Experiment Station eight miles northwest of Allegan, in southwestern Michigan. Both birds had been banded at the Jack Miner Bird Sanctuary, Kingsville, Ontario, Canada.

The younger of these two birds was a male weighing 9 pounds, 1 ounce. It was shot on November 2 along with 133 other geese, 5 others of which also carried Jack Miner bands. The band on this bird read "JM CF 43 1st Pet 5:7." It was at least 12 years old when shot.

The second bird, a male, was found dead in the refuge bordering the Highbanks shooting area during a routine mortality survey on November 10. Death was attributed to wounds received over the shooting area at an earlier date. No accurate weight could be secured. This old bird carried two bands: a well-worn band reading "32F, MARK 5:36" and another band reading "AS 44, MARK 5:36." A communication from Mr. Manly F. Miner stated that the older band was put on in the "fall of 1932" and the newer one "on April 3, 1944." This bird, then, was not less than 23 years old. We are unable to find in the literature a record of a wild Canada Goose older than "Mark 5:36."

During the 1954 waterfowl season three other interesting age and weight records were secured at Swan Creek from Canada Geese carrying Jack Miner bands. On November 12 a male weighing 10 pounds, 10 ounces, carrying band "JM MF 39 Heb 10:24" was shot. This bird was at least 15 years old. On November 11 a male weighing 7 pounds, 2 ounces, carrying band "JM ES 41," was harvested when it was at least 13 years old. On November 7 a female at least 12 years old, carrying band "JM CF 42 He careth for you," was shot. This bird weighed 8 pounds, 9 ounces.

During the 1951 waterfowl season a goose carrying a Jack Miner band (33F), indicating that it was banded in 1933, was reported to have been harvested on the experiment station on October 31. Since the bird was not handled at the station headquarters, no sex or weight was obtained. This goose lived at least 18 years.—CLAYTON H. DOUVILLE AND CHARLES E. FRILEY, JR., *Michigan Department of Conservation, Allegan, Michigan.*

***Touit huetii* (Temminck) from Brazil.**—This beautiful parrotlet was illustrated by Lohse in Goeldi's "Album de Aves Amazônicas" (Table 16, Fig. 7, 1900–1906), without indication of the origin of the account. E. Snethlage mentioned the species in her "Catálogo das Aves Amazônicas" (1914), recording 1 female from Pará. Later authors, however, did not list Huet's Parrotlet for Brazil: Hellmayr (Cat. Birds Amer., pt. 2, No. 1, 1918) ignored the statement of Snethlage, giving the range of the species as Venezuela, Ecuador, Perú, the Guianas, and Trinidad. Pinto followed Hellmayr and omitted the bird in his "Catálogo das Aves do Brasil" (Vol. 1, 1938). In his revision of the catalogue of Snethlage, Pinto mentioned that the species only occurs in the "Amazônia extrabrasileira" (Bol. Museu Paraense E. Goeldi, 10:21, 1948). Neither the Museu Nacional of Rio de Janeiro nor the São Paulo Collection (Departmento do Zoologia) contains a specimen of this parrotlet.

Last year I received a fine specimen of *Touit huetii* from Marabá, Lower Rio Tocantins, Pará—an adult male, collected in May, 1955 by local hunters, who sold the bird to my preparator, J. Hidasi. The specimen has subsequently been given to the collection of the Museu Nacional, Rio de Janeiro.

At my suggestion, F. Novaes, ornithologist of the Goeldi Museum in Belém, attempted to find some evidence for Snethlage's statement. First he wrote me that there was nothing to be discovered, but 2 months later he communicated that—in the cellar of the Goeldi Museum—he found an unused exposition stand, without a bird, but labelled in the following manner: "*Urochroma hueti*—Periquito—Localidade: Tucunduba, 1898 collecionado por Lohse." (Tucunduba is located near Belém, Pará.) These scant remains and the recent record from the Tocantins River support the Snethlage statement. The specimen obtained by Lohse is evidently lost.

Touit huetii differs from the other 3 Brazilian species of this genus (*wiedi*, *surda*, and *purpurata*) in having the scapulars green like the back (not brown); it differs from *stictoptera* and *emmae* from Colombia in having the forehead and lores blackish-blue, and the front part of the cheeks blue (not green); it differs from *delectissima* from Venezuela and Panama in having the under wing-coverts and axillaries red (not yellow). The bill of *Touit huetii* from Marabá is yellowish, and the feet and iris are brown; wing 115, tail 44 mm. After this note was finished, I received a colored sketch of a parrotlet recently killed at Serra do Cachimbo, South Pará, between the Xingú and Tapajós rivers. This specimen, deposited in the Museu do Estado de Goiás, Goiânia, is evidently *Touit huetii*. The range of the species is thus considerably larger than formerly supposed.—HELMUT SICK, *Fundação Brasil Central, Av. Nilo Peçanha 23 III, Rio de Janeiro, D. F. Brasil.*

REVIEWS

Louisiana Birds.—By George H. Lowery, Jr. Baton Rouge, Louisiana State University Press. Xxix + [iii] + 556 pp., pls. I–XL (by R. E. Tucker; 11 col.), 1 col. and 82 black and white photos. in text, text-figs. 1–135 (photos., line-drawings, maps, etc.), tables 1–3, endpaper photos. Price, $5.00.

In this well-made and conservatively priced book George H. Lowery, Jr., has provided beginning and moderately advanced Louisiana bird students (and others) with an introduction and guide to the abundant bird life of Louisiana and to selected aspects of the larger subject of ornithology as well. Louisiana is well supplied with major works on its birds, "The birds of Louisiana" by S. C. Arthur having appeared in 1931, followed by H. C. Oberholser's more technical and ambitious "The bird life of Louisiana" in 1938. Although Lowery correctly indicates that these works are already out of date, he hastens to say that the present work "is not a state bird book in the traditional sense . . . assembling for convenient scientific reference the specific records and factual data upon which . . . generalizations concerning the various species are based."

After routine preliminaries, the book contains readable, up-to-date accounts of Louisiana as a place to see birds; The history of Louisiana ornithology (presenting material not readily available elsewhere); The Louisiana State University Museum of Zoology; How to identify birds; Feathers, plumage, and molt; The bird skeleton; Migration; Economic value of birds; Conservation and wildlife management; Attracting birds; and Ornithological societies and bird clubs. These sections should serve the beginner well; the author manages, unlike some who have attempted similar tasks, to retain appropriate scientific sophistication and dignity without becoming ponderous and remote. His explanations are lucid and sensible, and his skillful account of the function of a research museum should do much to promote understanding between professional and nonprofessional students.

There follow concise accounts of the 377 species of birds regarded by the author as properly accredited members of the Louisiana avifauna and 7 additional species recorded on grounds less than satisfactory (distinguished in text by square brackets). The author cannot be too highly praised for his progressiveness in restricting himself, in a work of this type, to binomial nomenclature and the treatment only of full species.

There is no formal organization in the species accounts; they include brief comments on status and habitat in Louisiana, habits, method of recognition, and fairly frequent mention of specific records. Every species seems to appear at least once in the illustrations, which are referenced in text. Near the end of the book is a helpful chart showing graphically the seasons of occurrence of Louisiana birds, and there is a useful, briefly annotated bibliography supplementing and bringing up to 1954 that of Oberholser's work. The index seems more than adequate.

It is difficult to find much to criticize in the text, which has been carefully executed and appears nearly free of technical and typographical error. An effort has clearly been made to get into a single work everything necessary for the beginning and potentially serious student in Louisiana, including the means of identifying all species occurring there. This, unfortunately, has resulted in a book a bit too large to be carried conveniently in the field, and it appears to this reviewer that, except for the exclusion of extralimital species, the work has no marked advantages as a recognition manual over the better standard guides already available.

The illustrations by Robert Tucker seem adequate for purposes of identification. It should not be serious discouragement to an energetic newcomer to ornithological

illustration, however, to say that Tucker has a vast amount to learn about the use of line, the use of paint, and about birds, before his brush will be a match for Lowery's pen. Many of the photographs (largely contributed by Allan D. Cruickshank and Samuel A. Grimes) are excellent.

This work should be of value to all Louisiana bird students and useful in adjacent Gulf states.—ROBERT M. MENGEL

A Check List of The Birds of Southern Rhodesia with Data on Ecology and Breeding. Reay H. N. Smithers, Michael P. Stuart Irwin and Mary L. Paterson. Rhodesian Ornithological Society, University Press, Cambridge. ix + 175 pp., 2 colored plates, 8 text-maps, 1 folding map. 1957.—This welcome little volume presents for the first time a thoroughly authentic list of the birds of Southern Rhodesia and, along with White and Winterbottom: *A Check List of the Birds of Northern Rhodesia*, 1949, and Benson: *A Check List of the Birds of Nyassaland*, 1953, completes a trio of handy reference works on the three countries of the Central African Federation. After rejecting 32 species previously listed on the basis of vague or unsubstantiated evidence, the authors present an annotated list of 565 species which have been collected within the political boundaries of the country. A few additional species reported or strongly suspected of occurring but not yet collected are inserted parenthetically. A brief description of the topography and vegetation and a series of maps provide a good though sketchy introduction to the area. A gazeteer of about 115 place names is useful though incomplete. Nomenclature essentially follows that of J. Vincent (A Check List of the Birds of South Africa) but goes farther in lumping species within large generic units. The few lines allotted to each species and subspecies provide a thumbnail sketch of distribution, ecology, and season of occurrence. Data on breeding seasons as compiled by H. Miles from records submitted by cooperators of the Rhodesian Ornithological Society nest-card scheme are well presented and constitute an outstanding feature of the book. These records indicate nearly year-round breeding activity for many species of water birds, doves, louries, parrots, etc. The general organization is good but one wonders whether more information might not have been included without appreciably expanding the size of the volume. The reviewer also wonders if full data on type specimens need have been included in a book of this sort. The two color plates by H. Reid Henry are meaningful and attractive. The whole constitutes a reliable and handy reference work on a badly neglected section of the African continent.—JOHN T. EMLEN, JR.

Birds of New Guinea. Tom Iredale, illustrated with thirty-five plates in color, figuring 347 birds by Lilian Medland. Two volumes. Georgian House, Melbourne, Australia. Vol. I, pp. xv + 230, Vol. II, pp. xv + 261. 1956. Price $58.16.—Iredale, in his 78th year and still Honorary Zoologist of the Australian Museum, Sydney, published his first paper in 1907 on a New Zealand bird. A recent bibliography (1956) credits him with 326 titles and 2542 new names, proposed alone or in collaboration with others. Iredale is perhaps better known as a bibliographer and nomenclaturist in the field of mollusks, with a penchant for elevating the rank of groups to higher status than most workers approve. But for twelve years he was G. M. Mathews' private secretary, when the twelve-volume *Birds of Australia* and the Australasian *Systema* were in progress; was a member of the B.O.U. Committee on Nomenclature; and in 1950 he brought out *Birds of Paradise and Bower Birds*, illustrated by his wife, better known as Lilian Medland.

The present work covers the New Guinea avifauna, which is a rich one with about 570 resident species, many of them peculiar endemics. The most recent previous work with descriptions covering the field was Salvadori's (1880–1890). Since that time exploration and research has pushed ahead rapidly. In 1941 Mayr summarized this in his admirable "list," but identification of New Guinea birds outside of a big museum is very difficult.

Iredale's new volumes, describing some 650 species and 1500 subspecies is intended for the student interested in knowing even a little about New Guinea birds. The 35 plates, illustrating 347 birds in color, delineated by Mrs. Iredale (since deceased) are perhaps adequate to give an idea of some of the birds of this wondrous avifauna. The birds (averaging nearly 10 to a page on a plain background) are in conventional poses, apparently mostly drawn from skins, and we have such unhappy things as a ground pigeon that walks about on the forest floor like a bantam, perched instead like a typical tree pigeon; swifts (*Collocalia* and *Chaetura*) perched like sparrows, and a nightjar (*Caprimulgus*) sitting up like a frogmouth (*Podargus*).

The text is less fortunate. A generally worded description of each form is usually imbedded in a narrative style discussion of names, localities, nomenclatural history, and variation, all so discursive and without references as to be of little interest to a specialist, while quite beyond any general bird student. The lack of keys and the lack of stressed key characters makes identification in some groups quite hopeless.

Iredale's ideas on taxonomy will find little favor with most modern workers. One gets the impression that if named subspecies are difficult to distinguish without series for comparison they are of no importance; if they can be easily distinguished, they should be called species. Sometimes his views on polymorphic species are peculiar. In the goshawk (*Accipiter novaehollandiae*) of the Australia–New Guinea area which has a white and a gray phase, he recognizes at least four species, some of which can be sympatric and interbreeding (p. 125). He has no sympathy with the polytypic species. At the generic level, Iredale believes in lots of them and in this popular work proposes at least 16 more genera or subgenera (in a work like this without references it is not always easy to tell if a new name is introduced or an old one is resurrected). One of them is based on the fact that the type of the genus is smaller than its presumed nearest relatives. At higher levels, where scientific names are not used, we find cranes, rails, and grebes grouped together; the tropic birds are placed next to the terns; and the owls are back next to the hawks.

Reading these volumes one would think that the taxonomy and nomenclature of New Guinea birds was in confusion. Actually, E. Mayr's "List," published in 1941, gave us a sound framework of nomenclature, supported by a great many careful revisions. Iredale seems to have ignored this as well as some more recent revisions. The present volumes seem closer to Mathews' *Systema Avium Austrasianarum* (1927–1930).

Anyone who looks for much on habits in this volume will be disappointed. The introduction (p. 5) states that, "The habits have been noted only in a general way, as most bird habits are basically similar, and there is little of novelty to notice." This of an area where birds-of-paradise display, megapodes bury their eggs and leave them to hatch, a kingfisher digs in the ground for worms, and female hornbills are walled in their nest for the incubation period.

The two volumes are beautifully made, and despite the many shortcomings of the text, they are the only ones that cover this field.—A. L. Rand.

Eagles.—Leslie Brown. London, Michael Joseph. 270 pp. 31 photo pls. 1955. Price 18 s.—Eagles abound in Africa and possibly one could not find a better place to observe them than on the slopes of Mount Kenya where Leslie Brown, a colonial officer by trade and a naturalist of experience, began his studies in 1948. The Embu district is a region of rocky hills and thornbush where eleven species of eagles have nested. These birds, all observed over a number of years, included the trio of major eagles,—Martial, Verreaux's, and the Crowned Hawk Eagle, largest and finest of the lot, as well as odd species such as the Bateleur and snake eagles. Brown has also studied the Golden Eagle over many years when on home leave in Scotland. Life histories and the biology of eagles are discussed in regard to methods of hunting and killing, types of prey, powers of flight, territory and foraging range, courtship, display, the nest, eggs, incubation and rearing of the eaglet. This material represents original observations. Brown has presented his subject with an eye to broader generalizations as well as to specific details. One learns that eagles spend comparatively little time hunting and that where they were observed most often, on Eagle Hill, many species nested relatively close together without fighting, a finding which Brown could only explain on a supposition that these predators were interspecifically gregarious. Many of the eagles studied were more prevalent in the haunts of man than in uninhabited bush. Kenya eagles were tame. The native Wambere didn't persecute them, apparently feeling that while some were harmless or merely tiresome, others which killed rats, snakes, or crop-eating game birds were obviously useful. Brown gives an interesting account of his native companions and helpers, one of whom, Njeru, came as close to being an African ornithologist as one is likely to find.

The book contains excellent photographs, taken by the author at close range from hides. Some of the pictures are fascinating, such as the one of the snake eaglet pulling a snake from its parent's gullet. Much of Brown's data have been published in scientific journals. The book, however, has enabled him to bring his experiences together in a comprehensive way. It is obvious that the author is a man well-adapted to studying these great birds of prey;—he is a hunter able to kill a black buffalo with one bullet and an individual ready to tackle anything from a trek over miles of uninhabited bush to climbing a tall tree in a gale of wind to reach his hide, even under attacks of the parent Crowned Hawk Eagles. Any student of bird behavior should find "Eagles" a noteworthy contribution. Those with more general interests will find it a readable, occasionally exciting book, written by a first rate naturalist who, while persistent in pursuing his special subject, was much alive to the fascinations of the African bush, whether of the natives, the scenery, or the interrelations of living things.—LAWRENCE KILHAM.

NOTICE

The National Science Foundation will award grants to defray partial travel expenses for a limited number of American scientists who wish to participate in the XIIth International Ornithological Congress which is scheduled to meet in Helsinki, Finland, June 5 to 12, 1958.

Application blanks may be obtained from the National Science Foundation, Washington 25, D. C. *Completed application forms must be submitted to the Foundation by January 20, 1958.*

RECENT LITERATURE

EDITED BY FRANK McKINNEY

Anatomy and Embryology

Auber, L. 1957. The distribution of structural colours and unusual pigments in the Class Aves. Ibis, **99:** 463–476.—The two types of common structural colors (barbule-borne iridescence and Tyndall color) in feathers do not occur together (some members of the Cuculidae, Thraupinae, and Paradiseidae are exceptions). Tyndall colors of bare skin and beaks usually do not occur intensely in birds with either type of structurally-colored feathers.—R. F. J.

Davis, J. 1957. Determination of age in the Spotted Towhee. Condor, **59:** 195–202.—For determining age in *Pipilo erythrophthalmus* the author has employed five characteristics in combination: color of primary coverts, shape of rectrices, width of white spots on the fourth rectrix, wear, and iris color.—D. W. J.

Behavior

Andrew, R. J. 1957. Influence of hunger on aggressive behavior in certain buntings of the genus Emberiza. Physiol. Zool., **30:** 177–185.—Aggressive encounters become more frequent in flocks of *E. citrinella* after food is removed. This is caused by increased activity due to hunger. After fasting, encounters are frequent because of close crowding of birds trying to feed at once. Experiments suggest that hunger has no direct effect on the threshold of aggressive responses. The relation of aggression to other "drives" is discussed and it is suggested that aggression should not be considered as subordinated to other instincts (sex and feeding).—F. M.

Banks, E. M., and W. C. Allee. 1957. Some relations between flock size and agonistic behavior in domestic hens. Physiol. Zool., **30:** 255–268.—Variations in rates of pecking, threatening, and avoiding in flocks containing 6, 12, and 24 hens are interpreted in terms of dominance relationships and the effects of crowding.—F. M.

Davis, D. E. 1957. Aggressive behavior in castrated Starlings. Science, **126** (3267): 253.—"This paper reports the maintenance of aggressive behavior in castrated starlings and the failure of testosterone to affect their social rank."

Dzubin, A. 1957. Pairing display and spring and summer flights of the Mallard. Blue Jay, **15:** 10–13.—A brief account which describes the main display postures and reports original observations on aerial behavior made in Manitoba and Saskatchewan. Spring courtship flights, territorial pursuits, group chases, and summer courtship flights are distinguished. The Continuous Call of the female is heard during a short period prior to egg-laying.—F. M.

Goodwin, D. 1956. The significance of some behaviour patterns of pigeons. Bird Study, **3:** 25–37.—Observations on many species are reported. Head Shaking, resembling the comfort movement, occurs in response to another bird's "coos." It appears to be the outlet for psychologial as well as physical irritants. It may be inhibited in the case of positive sexual feeling toward the other bird. Nodding is derived from nest-building movements and signifies the bird's intention of "holding its ground." It may be hostile or appeasing in context. Driving occurs only in the presence of other pigeons and serves to prevent the mate being inseminated by other males. The behavior of the male when interfering with

copulation of another pair has the same causation and function as driving. The interfering male reacts to the female of the pair as though she were his mate. An instantaneous response to the sight of a pair copulating is thought to have survival value in ensuring efficient protection of the mate when she happens to be the bird involved. Displacement preening and caressing are also discussed.—M. T. M.

HAMERSTROM, F. 1957. The influence of a hawk's appetite on mobbing. Condor, **59:** 192–194.—A tethered male Red-tailed Hawk was mobbed more frequently when hungry ("sharp set") than when well fed. It was mobbed more consistently at high rather than at low perches, and also when flying low rather than soaring. Conditioned mobbing was observed to occur in Robins.—D. W. J.

HINDE, R. A. 1954. The courtship and copulation of the Greenfinch (Chloris chloris). Behaviour, **7:** 207–232.—A detailed analysis of the behavior of captive birds. Each behavior pattern which occurs during courtship and copulation is associated with a particular combination of strengths (and relative strengths) of tendencies to attack, flee from, and behave sexually toward the mate. The male is dominant to the female in winter but is subordinate during the breeding season. Comparisons are drawn between the Greenfinch and Chaffinch.—F. M.

HINDE, R. A. 1956. The behaviour of certain Cardueline F_1 inter-species hybrids. Behaviour, **9:** 202–213.—In a study of hybrids between *Carduelis carduelis, Chloris chloris,* and the domestic Canary, behavior patterns which are common to both parent species are unchanged in the hybrids. Other behavior patterns which differ in the parent species occur in an intermediate condition.—F. M.

JOHNSTON, R. F. 1957. Selection and emberizine distraction display. Condor, **59:** 266.

LAHRMAN, F. W. 1957. Aggressive behavior of a Whooping Crane. Blue Jay, **15:** 14–15.—A family of Whooping Cranes walked many yards toward the author, led by the male which behaved in an aggressive manner.—R. W. N.

LEHRMAN, D. S. 1955. The physiological basis of parental feeding behavior in the Ring Dove (Streptopelia risoria). Behaviour, **7:** 241–286.—Author's conclusions: "Prolactin acts to elicit parental regurgitation-feeding primarily because it causes engorgement of the crop and suppression of sexual behavior, rather than through an effect on central nervous mechanisms specific for parental behavior. The engorgement of the crop makes it sensitive to emetic stimuli provided by movements of the squab's head against the parent's breast. In addition, this crop-engorgement acts as a drive stimulus through which the dove learns to respond to the sight and/or sound of the squab."

LOCKIE, J. D. 1956. Winter fighting in feeding flocks of Rooks, Jackdaws and Carrion Crows. Bird Study, **3:** 180–190.—Aggressive behavior of *Corvus frugilegus, C. monedula,* and *C. corone* was either in defence of a mate, or over food. Various postures are illustrated. Courtship feeding and copulation continued until the mean temperature reached about 40° F. When the ground was frozen, fighting over food was greatly increased. In the warm fall of 1953, food was abundant but encounters were frequent (recrudescence of sexual behavior). It is suggested that food fighting combined with the existence of social hierarchy has the same survival value as asynchronous hatching in nestlings: the unequal distribution of food ensures that some birds survive in good condition.—M. T. M.

MORRIS, D. 1956. The feather postures of birds and the problem of the origin of social signals. Behaviour, **9:** 75–113.—This valuable review focusses attention on the part played by body-feather posturing in display. In a discussion of the

thermoregulatory function of body feathers, four feather postures are distinguished: sleeked, relaxed, fluffed, and ruffled. The signal functions of these feather postures in both thwarting and nonthwarting situations are discussed. The physiological relationship between thwarting and feather-erection is thought to be the basis of feather-posture displays, and has led to the evolution of crests, ruffs, and other specialized structures. The somatic and autonomic responses to thwarting are discussed an.' the signal mechanisms which have evolved from alimentary, circulatory (bare-skin-flushing displays), respiratory (vocalization and inflation displays), and thermoregulatory changes (feather-erection displays) are described.—F. M.

NAVAS, J. R. 1956. Manifestaciones Vocales de las gallaretas. Hornero, **10**: 119–135.—Description of the considerable differences in the call notes of *Fulica armillata* and *F. rufifrons*, with observations on distinctions in calls of male and female through which the sex may be recognized. (English summary.)

RIPLEY, S. D. 1957. The display of the Sickle-billed Bird of Paradise. Condor, **59**: 207.

ROST, K. 1957. Am winterlichen Schlafplatz der Türkentauben. Journ. für Ornith., **98**: 204–209.—Discusses the roosting habits of the Collared Turtle-dove (*Streptopelia decaocto*) in relation to weather and time of year.—H. C. M.

SCHAEFER, J. 1955. A White-billed Diver in captivity. British Birds, **48**: 501–504.—Observations on the behavior of a bird of the northern species *Gavia adamsii*.—M. T. M.

SIMMONS, K. E. L. 1955. The nature of the predator-reactions of waders towards humans; with special reference to the role of the aggressive-, escape- and brooding-drives. Behaviour, **8**: 130–173.—An important review and discussion, illustrated by photographs and drawings. The reactions of nesting shorebirds are classified under the heading of escape, displacement-activities, demonstration, distraction-display, threat behavior, and attack. Most of the reactions, other than overt escape and attack, are the result of conflict between these two tendencies. The role of the brooding part of the parental drive is discussed. Although distraction-displays are so ritualized that their origin is obscure, it is suggested that the locomotory intention-movement may be the most important source.—F. M.

SIMMONS, K. E. L. 1957. The taxonomic significance of the head-scratching methods of birds. Ibis, **99**: 178–181.—Birds scratch their heads either by bringing a leg straight up forward or by drooping a wing and bringing the leg up over the shoulder. Implications of the occurrence of these patterns are discussed; for example, Beecher's phylogeny of the oscines is not supported (the Timaliidae scratch straight forward).—R. F. J.

THORPE, W. H. 1956. The language of birds. Scientific American, **195** (4): 128–138.—A general account of the types of sounds characteristic of birds and their functions. The Chaffinch (*Fringilla coelebs*) is used as an example. Chaffinches use an easily located call to warn of the location of a perched bird of prey. Flying birds of prey elicit a warning note which is difficult to locate. The Chaffinch inherits a song of about the length typical of the species. However, certain characteristics of the song must be learned from older more experienced singers. Individual Chaffinches have a critical six-week period of ability to learn a song pattern, following which their song pattern is fixed for life.—J. C. H.

THORPE, W. H. 1957. Some implications of the study of animal behavior. Scientific Monthly, **84** (6): 309–320.—A review of past concepts of the behavior of animals

and a consideration of the meaning of recent researches. The behavior of animals other than man is more like that of man than earlier students of animal behavior believed it to be.—J. C. H.

Bibliography and Biography

Rokitansky, G. 1957. Johann Natterer, Erster Ornithologe Oesterreichs. Journ. für Ornith., **98:** 133–144.—A transcript of a speech on the life of Natterer (1787–1843), who was for many years associated with the museum in Vienna and is known for his work with Brazilian birds.—H. C. M.

Stresemann, E. 1957. Aus der Gründungsgeschichte des "Journal für Ornithologie." Journ. für Ornith., **98:** 172–184.—On the founding of the J. f. O.; the exchange of letters between J. Cabanis and E. Baldamus.—H. C. M.

Diseases and Parasites

Asmundson, V. S. and C. F. Pun. 1956. Crooked neck dwarf in the turkey. Journ. Exp. Zool., **131:** 225–238.—Description of a lethal mutation resembling one known in the domestic fowl.—J. T. E.

Groupé, V., and F. J. Rauscher. 1957. "Nonviral" tumors produced in turkeys by Rous sarcoma virus. Science, **125** (3250): 694–695

Jenkins, D. 1955. Causes of death in partridges. Bird Study, **2:** 142–143.

Jennings, A. R. 1955. Diseases in wild birds. Bird Study, **2:** 69–72.

Jennings, A. R., and E. J. L. Soulsby. 1956 Diseases in wild birds, third report. Bird Study, **3:** 270–272.

McGhee, R. B. 1957. Infection of chick embryos by *Crithidia* from a phytophagous hemipteron. Science, **125** (3239): 157–158.

Olsen, M. W. 1956. Fowl pox vaccine associated with parthenogenesis in chicken and turkey eggs. Science, **124** (3231): 1078–1079.

Quortrup, E. R., M. E. Goetz, J. W. Dunsing, and M. N. Rosen. 1957. Studies on the incidence of poultry diseases in wild ducks. Calif. Fish and Game, **43:** 139–141.—Reports the results of serological tests on 651 wild ducks and 181 Coots. In the ducks, the incidence of salmonellosis was negligible, but ½% showed exposure to Newcastle disease. The Coots showed a relatively high exposure to *Salmonella typhimurium*, 4.9% giving a strong positive reaction.—F. M.

Rosen, M. N., E. R. Quortrup, M. E. Goetz, and J. W. Dunsing. 1957. Studies on the incidence of poultry diseases in Coots. Calif. Fish and Game, **43:** 143–146.—Serological tests on 862 Coots revealed a relatively high incidence of exposure to salmonellosis.—F. M.

Schinazi, L. A. 1957. Observations on a fast-moving protein in avian malarial serum. Science, **125** (3250): 695–697.

Williams, M. C. 1957. Birds in relation to the arthropod-borne virus zoonoses. Ibis, **99:** 303–306.

Distribution

Borrero, J. I., and J. H. Camacho. 1957. Notas sobre aves colombianas. Dos nuevas aves para la avifauna colombiana. Caldasia, **8** (35): 357–358.—First Colombian records for *Cinnycerthia unirufa chakei* (Sierra de Perijá, originally recorded as the nominate race) and *Dendroica pensylvania* (Oct. 23–Nov. 15; first reports from South America).—E. E.

Bourne, W. R. P. 1957. Additional notes on the birds of the Cape Verde Islands, with particular reference to *Bulweria mollis* and *Fregata magnificens*. Ibis, **99:** 182–190.

CAMPBELL, B. 1955. The breeding distribution and habitats of the Pied Flycatcher (*Muscicapa hypoleuca*) in Britain. Parts II and III. Bird Study, **2:** 24–32, 179–191.—A British Trust for Ornithology Investigation. Distribution was discussed in Part I. The general biotope is highland valleys and foothills up to the tree limit. Favored habitats lack continuous shrub layer and field layer. Habitat requirements are food available upon arrival, protective cover, nest sites, (including nest boxes), perches for song, display and feeding sallies, nest materials, and continuing food supply. Absence from the Scottish Highlands may be due to a temperature barrier, or to deforestation-reafforestation sequences, and may be related to the northward spread of the Great Spotted Woodpecker. "Influxes" of flycatchers in 1864–6, 1885, 1898, 1899, and 1901 produced establishment in new areas. Since 1901 its spread has been gradual from established breeding areas.—M. T. M.

EISENMANN, E. 1957. Notes on birds of the province of Bocas del Toro, Panama. Condor, **59:** 247–262.—This is a report of birds observed during a five-day trip. In all, 85 species are mentioned of which thirteen represent new records for the province and one, the White-collared Seedeater, a new record for Panama.—D. W. J.

ESCALANTE ROSSI, R. 1956. Nuevo hallazgos de la Pajera de Pico Recto en el Uruguay. Hornero, **10:** 164–166.—Record of *Limnoctites rectirostris* (Gould) taken near Manantiales, 16 Km. east of Maldonado, Uruguay, in February, 1953. Colors of bill, iris, and feet are given.

GLADKOV, N. A. 1957. Birds of Mangyshlak Peninsula (Caspian). Ibis, **99:** 269–274.

GODFREY, W. E. 1956. Some distributional notes on Canadian birds. Canad. Field-Nat., **70:** 136–138.

HAEDO ROSSI, J. A. 1956. Notas Ornitológicos I: Presencia del Piquero Pardo en la Argentina. Hornero, **10:** 166–167.—Second record of *Sula leucogaster leucogaster* (Boddaert), taken in the Río de la Plata, July 11, 1952.

JOHANSEN, H. 1957. Die Vogelfauna Westsibiriens. Journ. für Ornith., **98:** 155–171.—Birds of western Siberia, Part III, Falconinae.—H. C. M.

LEMIEUX, L. 1956. Seventh census of nonpasserine birds in the bird sanctuaries of the north shore of the Gulf of St. Lawrence. Canad. Field-Nat., **70:** 183–185.

LÓPEZ, R. B. 1956. La Paloma Antártica en Mar del Plata. Hornero, **10:** 168.—10 Sheathbills (*Chionis alba*) observed July 9, 1954, at the port of Mar del Plata, Province of Buenos Aires; most northern record to date in Argentina.

LUMSDEN, H. G. 1957. A Snow Goose breeding colony in Ontario. Canad. Field-Nat., **71:** 153–154.—More than 1,000 Snow Geese (*Anser caerulescens*) were found breeding on Cape Henrietta Maria in 1956.—R. W. N.

MCATEE, W. L. 1957. Early notes on Carolina birds. Chat, **21:** 31–37, 50.

MCEWEN, E. H. 1957. Birds observed at Bathurst Inlet, Northwest Territories. Canad. Field-Nat., **71:** 109–115.

NISBET, I. C. T. 1955. Bewick's Swans in the Fenlands: The past and present status. British Birds, **48:** 533–537.—Since 1938 *Cygnus bewickii* has begun to winter regularly in East Anglia. Numbers have increased. It is suggested that a movement in the latter part of the winter through Scotland, to Ireland, has shifted southward and that birds from Holland find fen conditions favorable and remain there.—M. T. M.

OLIVARES, A. 1957. Aves de la costa del Pacifico, municipio de Guapi, Cauca, Colombia. I. Caldasia, **8** (35): 359–381.—First introductory section of an article on the birds of an area on the Pacific coast of Colombia.—E. E.

PAYNTER, R. A., JR. 1957. Rough-winged Swallows of the race stuarti in Chiapas and British Honduras. Condor, **59:** 212–213.

PAYNTER, R. A., JR. and M. ALVAREZ DEL TORO. 1957. Blue and White Swallow in Mexico. Condor, **59:** 268.

PEITZMEIER, J. 1957. Zur neuesten Diskussion des nordwesteuropäischen Misteldrossel-Problems. Journ. für Ornith., **98:** 145–154.—Discusses the recent range extensions of the Mistle-thrush into northwest Europe.—H. C. M.

PORTER, R. D., and J. B. BUSHMAN. 1957. Characteristics and status of the Solitary Sandpiper in Utah. Condor, **59:** 203–206.—In a study of ten specimens of *Tringa solitaria*, the race *solitaria* is known from Utah by a single specimen taken in the fall, whereas *cinnamomea* has been taken once in the spring and several times between July 9 and September 13. No nest has been found for this species in the state.—D. W. J.

REED, E. B. 1956. Notes on some birds and mammals of the Colville River, Alaska. Canad. Field-Nat., **70:** 130–136.

SCOTT, P. 1955. Ring-necked Duck in Gloucestershire: A new British Bird. British Birds, **48:** 377.—A wild *Aythya collaris* appeared at the Wildfowl Trust collection at Slimbridge on March 12, 1955 and stayed three days. It is the first authentic record for Europe; however an 1801 record appears acceptable.—M. T. M.

SMITH, K. D. 1957. An annotated check list of the birds of Eritrea. Ibis, **99:** 1–26; 307–337.

SOPER, J. D. 1957. Notes on wildfowl of Slave River delta and vicinity, Northwest Territories. Canad. Field-Nat., **71:** 74–81.

STAFFORD, J. 1956. The wintering of Blackcaps in the British Isles. Bird Study, **3:** 251–257.—An average of 25 records each winter of *Sylvia atricapilla*. Possible foods eaten by this insectivore in winter are discussed. Females predominated in northern records. Early migration in February is discussed as a possibility. There is a slight, but definite northward movement within the country from December onward.—M. T. M.

TENER, J. S. 1956. Annotated list of birds of part of the Back River, N. W. T. Canad. Field-Nat., **70:** 138–141.

URBAN, E. K. 1957. Birds observed at Resolute Bay, Cornwallis Island, Northwest Territories. Passenger Pigeon, **19:** 73–75.

WATSON, A. 1957. Birds in Cumberland Peninsula, Baffin Island. Canad. Field-Nat., **71:** 87–109.—A thorough study of the bird-life from May to September 1953 with data on several aspects of bird-biology.—R. W. N.

WELTY, C. 1957. The geography of Birds. Scientific American, **197** (1): 118–128.—A popular account of bird distribution presenting many of the factors responsible and examples of the birds they influence.—J. C. H.

WETMORE, A. 1957. The birds of Isla Coiba, Panamá. Smiths. Misc. Coll., **134,** no. 9: 1–105.—Wetmore collected for a month on Coiba, the largest island off the Pacific coast of Central America, with results which are of general zoogeographic interest. Though Coiba is but 15 miles from the mainland, four endemic races had previously been recorded, and Wetmore describes sixteen more: *Centurus rubricapillus subfusculus, Cranioleuca vulpina dissita, Thamnophilus doliatus eremnus, Contopus cinereus aithalodes, Camptostoma obsoletum orphnum, Leptopogon amaurocephalus idius, Troglodytes aedon carychrous, Polioptila plumbea cinericia, Hylophilus flavipes xuthus, Parula pitiayumi cirrha, Basileuterus delattrii actuosus, Thraupis virens cumatilis, Ramphocelus*

dimidiatus arestus, Saltator albicollis scotinus, Tiaris olivacea ravida, Arremonops conirostris viridicata. The *Cranioleuca* is a species previously known only from South America east of the Andes. Other species new to Panama are *Laterallus exilis* and *Larus heermanni* (a sight record of a species hitherto unreported south of Guatemala). Of the 133 forms recorded from Coiba, 97 are believed to be breeding species, which means that over 20% of the residents are endemic races. Nevertheless all the land birds (except *Cranioleuca vulpina*) are species common on the adjacent mainland. A curious feature of Coiba is that, despite being almost wholly forested, the passerines consist almost entirely of birds which, on the mainland, are generally found in fairly open areas or "edge" situations. On Coiba many of these species live also in the canopy of the highest forest trees—a niche occupied on the mainland by species absent from Coiba. Despite an abundance of suitable forest habitat, missing from Coiba are many of the characteristic neotropical families and genera. Either these groups had not yet reached the adjacent mainland at the time that Coiba became an island, or the habitat was then (or for some period became) unsuitable. In addition to listing the birds known from Coiba and observed on trips to and from that island, the paper contains valuable notes on behavior, breeding, ecology, taxonomy, and nomenclature. Each species is supplied with a Spanish and an English name, the former drawn, when available, from the local vernacular, the latter according in the main with "The Species of Middle American Birds."—E. E.

Williams, R. J. 1957. The Great Blue Heron colonies of Wisconsin. Passenger Pigeon, **19:** 51–66.

Williamson, K., and V. M. Thom. 1955. Hudsonian Whimbrel at Fair Isle. British Birds, **48:** 379–381.—A single *Numenius phaeopus hudsonicus* from 27–31 May 1955—the first British record of this race. Suitable conditions for transatlantic drift existed in the previous four days. *N. p. hudsonicus* lacks the white rump of the European race, and might deserve specific rank were it not for an Asiatic race with a barred rump. The rump probably has significance in courtship display, as in the Curlew, and ethological studies are called for.—M. T. M.

Ecology and Population

Boyd, H. 1957. Mortality and kill amongst British-ringed teal *Anas crecca*. Ibis, **99:** 157-177.—Analysis of 11,500 banded teal showed that female losses exceeded male losses (mean annual survival rate, ♂♂, 0.507; ♀♀, 0.430). The proportion killed by man seems to be greatly exaggerated in reported causes of death. Deaths in a summer are inversely proportional to deaths in a preceding winter.—R. F. J.

Boyd, J. M. 1956. Fluctuations of Common Snipe, Jack Snipe and Golden Plover in Tiree, Argyllshire. Bird Study, **3:** 105-118.—The game record of the Tiree Estate was analyzed for *Capella gallinago, Lymnocryptes minimus,* and *Pluvialis apricaria.* The considerable limitations of these data are discussed. Common Snipe were very abundant in 1911-14 and again in 1945-47. Troughs occurred in 1929-30 and 1952-54. For Jack Snipe the trends are similar, but the decline appears to be more sudden and the build up slower. Fluctuations in Golden Plover numbers are much less. Monthly fluctuations and weather are discussed.—M. T. M.

Burton, J. F. 1956. Report on the National Census of Heronries 1954. Bird Study, **3:** 42-73.—A publication based on the B.T.O. census. Changes in the population of a bird species in Great Britain are better known for *Ardea cinerea* than any other. The total population was censused in 1928, and again in 1954. Be-

tween these dates an Index has been calculated each year from an annual sample census. The Heron has increased considerably since 1928, especially in Wales. In England and Wales there were 4,708 nests in 301 heronries.—M. T. M.

CHURCH, H. F. 1956. The Mute Swan population of the eastern Borders. Bird Study, 3: 212-217.—*Cygnus olor* has evidently been increasing in Northumberland in the last 40 years. There is a seasonal movement between the lower Tweed valley (summer) and coastal flats (winter). The summer population on the estuary consists of non-breeders. This swan may not breed until its fourth or fifth year. M. T. M.

FRITH, H. J. 1957. Breeding and movements of wild ducks in inland New South Wales. C. S. I. R. O. Wildlife Research, 2: 19-31.—A semi-arid climate with local and temporary flood conditions has lead to the development of irregular movement patterns and breeding seasons. Some species are sedentary and have regular breeding seasons while others are nomadic and breed whenever and wherever conditions are suitable. Individuals of the same species may be sedentary or nomadic.—F. M.

GILLHAM, M. E. 1956. Feeding habits and seasonal movements of Mute Swans on two South Devon estuaries. Bird Study, 3: 205–212.—Use by *Cygnus olor* of four habitat types were distinguished: salt marsh turf (used in spring and early summer); salt water near mouth of river—*Zostera* (used in late summer and early winter, when land vegetation is mature and coarse); fresh water marsh turf (used in winter and early spring); fresh water above weirs (used in winter). Botanical studies of the considerable effects of grazing are being conducted.—M. T. M.

JONES, N. G. B. 1956. Census of breeding Canada Geese 1953. Bird Study, 3: 153-170.—A Trust-aided investigation of the British Trust for Ornithology. The total population of feral *Branta canadensis* in Britain was between 2,600 and 3,600 in July 1953, distributed in isolated subpopulations. The birds are sedentary, and many suitable waters have evidently not been colonized because they have not been visited by the geese. Social behavior leading to splitting of the original herd is described. This is an important paper for American students of geese, for its bearing on the matter of "tradition" in waterfowl is fundamental. "The migration appears not to be inherited." Human control measures are described, and usually have worse effects than no controls at all.—M.T.M.

LOCKIE, J. D. 1955. The breeding habits and food of Short-eared Owls after a vole plague. Bird Study, 2: 53-69.—There was a plague of *Microtus agrestis* in the Carron valley, Scotland in 1952-53. The study was made in 1954. Owls (*Asio flammeus*) were strongly territorial. Predation on eggs and young of owls by foxes and crows was heavy. It seems possible that owls and other predators hastened the decline in the numbers of voles early in the spring. But the failure of the voles to increase later in the summer was probably due to other factors. —M. T. M.

SUMMERS-SMITH, D. 1956. Mortality of the House Sparrow. Bird Study, 3: 265–270.—*Passer domesticus* in Britain seldom move more than a few hundred yards from the nest at any time in the year, but corpses are seldom found. Results of watching known birds and of analyzing banding returns are used in this survey 54% of the adult mortality occurs during only one-third of the year (Apr.-July). Since corpses are hard to find in grain fields, visited in August, the marked birds disappearing probably gives the best estimate for this month. On this basis 71% of the adult birds die in five months (Apr.–August). When feeding young greater risks are taken and adults are exposed to predation and disease in summer.

Average adult mortality is low by comparison with other species, owing to good food supplies all year round, and to lack of migrational hazards.—M. T. M.

VON SCHWEPPENBURG, G. 1957. Hohltauben und Marder. Journ. für Ornith., **98**: 185–189.—Fluctuation of a population of Stock Doves (*C. oenas*) and its relationship to Martens (*Martes foina* and *M. martes*).—H. C. M.

WATSON, A. 1957. The behavior, breeding, and food-ecology of the Snowy Owl *Nyctea scandiaca*. Ibis, **99**: 419–462.—Observations were made on the Cumberland Peninsula, Baffin Island. Much information on food intake and growth of young and the impact on rodent (mostly *Lemmus*) populations by pairs of breeding owls is given.—R. F. J.

YAPP, W. B. 1955. A classification of the habitats of British birds. Bird Study, **2**: 111–121.—A comprehensive classification of the habitats of British birds based on the vegetational background. In view of current American attempts to define standard terms for use by cooperative studies such as nest record schemes and faunistic surveys, Mr. Yapp's classification should be widely read.—M. T. M.

YAPP, W. B. 1956. The theory of line transects. Bird Study, **3**: 93–104.—A line transect may be used to determine the density of animals or plants by means of a formula which is given, derived, and explained.—M. T. M.

YAPP, W. B. 1956. The birds of high-level woodlands. The breeding community. Bird Study, **3**: 191–204.—Timberline is now at 1000–1500 ft. in England and Wales, rather higher in the Central Highlands of Scotland. The woodlands near this altitude are generally 90% pure *Quercetum*, *Betuletum*, *Alnetum*, *Fraxinetum*, or *Pinetum*. Line transects were used. 24 breeding species of bird are characteristic of these woods. Densities of birds were greatest in English and Welsh birchwoods, and in ashwoods. *Pinetum* was poorest in birds. Comparison with similar lowland communities of each type showed no difference except in the case of birch. About half the species are found in most woods. *Carduelis flammea* is almost exclusively a bird of birchwoods. Other species are characteristic of *Quercetum petraeae* or are tree-heath species which have invaded the woods. Absent species are ones needing shelter or a thick shrub layer.—M. T. M.

Evolution and Genetics

ABBOTT, U. K., and V. S. ASMUNDSON. 1957. Scaleless, an inherited ectodermal defect in the domestic fowl. Journal of Heredity, **47** (2): 63–70.

ASMUNDSON, V. S. 1955. Inheritance of spotting in the plumage of turkeys. Journal of Heredity, **46** (6): 285–288.

ASMUNDSON, V. S., and L. M. JULIAN. 1956. Inherited muscle abnormality in the domestic fowl. Journal of Heredity, **47** (5): 248–252.—Most of the muscles of the body are affected and the muscle changes resemble those occurring in human muscular distrophies. The condition results from a recessive gene. Heterozygotes are somewhat affected.—J. C. H.

MILLER, A. H. 1956. Ecologic factors that accelerate formation of races and species of terrestrial vertebrates. Evolution, **10**: 262–277.—The environment acts in speciation through inducing cyclic changes in population size. Low levels in population size permit genetic drift to play an important role in providing new combinations. The more frequent such fluctuations the faster a better gene combination will be reached under the influence of selection pressure. Continental areas of contrasting typography and hydrogradients are particularly important in race formation. Here population differentiates may be close together yet exist

in distinctive environments. Periodic geologic and ecologic rifts in the barriers separating such allopatric population units bring about introgressive contacts. Such new population contacts may result in favorable adaptive and compatible gene complexes for races and the allopatric semispecies already attained can yield species with important phyletic futures through testings under rigorous continental selection. Polytypic variation is favored in species having moderate innate ecologic tolerances rather than very broad or sharply restricted ones. Thus *Passerella iliaca* a strongly polytypic species has moderate ecological tolerances that have permitted it to move into new regions and habitats. These have put its pioneer population segments under new selective pressures. *Passerella lincolnii* is a species with very narrow ecological tolerances and it is divided into only three races despite its occupancy of a range comparable in extent to that of *P. iliaca*. *Carpodacus mexicanus* has very wide ecological tolerances with the result that the selective pressures it encounters are not sufficient to bring about strong polytypic variation. J. C. H.

MILLER, W. J. 1956. The hybrid-substance of the erythrocytes of the hybrids between *Columba livia* and *Streptopelia risoria*. Genetics, **41** (5): 700–714.—"The blood cells of hybrids between the domestic pigeon, *Columba livia*, and the ring neck dove, *Streptopelia risoria*, possess a 'hybrid-substance.' That is, they possess a serological reactivity not present in cells of either parent." (Author's summary.)

SAVILE, D. B. O. 1957. Adaptive evolution in the avian wing. Evolution, **11**: 212-224.—The aerodynamic aspects of the wings of birds are discussed. Four wing types are recognized: the elliptical, adapted to operate where space is limited; the high-speed wing of birds that feed on the wing or make long migration flights; the high-aspect-ratio wing of oceanic soaring birds; and the slotted high-lift wing of terrestrial soaring birds and predators that carry heavy loads. Similar wings occur in birds which are not genetically closely related. The loon has the highest wing loading and is stated to have the primitive avian wing form.—J. C. H.

SCHEINBERG, S. L. 1956. Genetic studies of cellular antigens in the chicken. Genetics, **41** (6): 834–844.

SHAKLEE, W. E., and C. W. KNOX. 1956. Selection for thyroid weight in New Hampshire chickens. Journal of Heredity, **47** (5): 211–212.

SIBLEY, C. G. 1957. The evolutionary and taxonomic significance of sexual dimorphism and hybridization in birds. Condor, **59**: 166–191.—This significant paper emphasizes the roles of sexual dimorphic characters and hybridization in speciation processes in birds. In attempting to establish relationships among avian taxonomy, hybridization, and sexual dimorphism, the author investigates at length the evolutionary significance of secondary sexual characters in several groups of birds: birds of paradise, hummingbirds, pheasants, grouse, manakins, and ducks. The discussion and summary are quite provocative.—D. W. J.

SOUTHERN, H. N. 1957. A study in the evolution of birds. Scientific American, **196** (5): 124–134.—A popular account of polymorphism in birds. Brief comment is made on the polymorphism found in the Red Crossbill, certain species of hawks, some jaegers, the Skua, owls, the Caribbean Sugarbird, the Gouldian Finch, and the cuckoo. More extended remarks concern the frequencies of bridled and non-bridled Common Guillemots (*Uria aalge*) along the Atlantic coast of Europe. The bridled color phase is increasingly common toward the North; it is not found in colonies in Portugal and attains its greatest frequency (50%) in Iceland. The frequency of the bridled color phase was first determined in 1938 and 1939; another determination being made 10 years later. The frequency of the bridled color

phase (with one exception) declined in every area where a significant change occurred. The suggestion is made that the bridled phase is better adapted to colder climates and its decrease results from a trend towards a warmer climate. —J. C. H.

WILLIAMSON, M. H. 1957. Polymorphism in Ross's Goose *Anser rossii*, and the detection of genetic dominance from field data. Ibis, **99:** 516–518.—Dimorphic young of Ross's Goose occur in broods the analysis of which supports the assumptions that the dimorphism is controlled by one pair of alleles, that the genotypes occur in the ratio $p^2 : 2pq : q^2$, and that mating is at random; in this instance, however, the further assumption that yellow down is dominant to gray down is as good as assuming the exact opposite.—R. F. J.

General Biology

AIREY, A. F. 1955. Whooper Swans in southern Lakeland. Bird Study, **2:** 143–150.—Winter studies of *Cygnus cygnus* in north-west England. Routes and flight lines, territory, greeting and sex display, molting, head and neck plumage staining, upending for food, and preening are discussed. The distribution and composition of flocks, and local weather movements are described.—M. T. M.

ALEXANDER, H. G. 1955. Field-notes on some Asian Leaf-warblers. British Birds, **48:** 293–299, 349–356.—The genus *Phylloscopus* is a Palaearctic group of some 30 species and 67 races, and includes some of the most difficult species to identify in the field. The genus was the subject of a monograph by C. B. Ticehurst (1938). This paper adds considerable further detail and comment on species of *Phylloscopus* and also on *Hippolais*, *Locustella*, and *Acrocephalus*.—M. T. M.

BEHLE, W. H. and W. A. GOATES. 1957. Breeding biology of the California Gull. Condor, **59:** 235–246.—In an attempt to complete extant data on life history and reproduction in this species, the authors report on details of early breeding biology: egg laying and incubation, growth of young, temperature regulation in young, mortality, and nesting success. Of interest was the fact that the first eggs laid required 26.7 days of incubation, the second 25, and the third 23.6 days. The interval between laying of eggs was also about two days. Young one or two days old have some temperature regulating capacity which improves with age. Reproductive success (eggs and young) was about 60%.—D. W. J.

BÓ, N. A. 1956. Observaciones Morfológicas y Etiológicas sobre el Biguá. Hornero, **10:** 147–157.—Notes on plumage changes, form of stomach, food, general habits, and nesting of the cormorant *Phalacrocorax brasilianus brasilianus* (Gmelin) in Argentina.

COULSON, J. C. 1956. Mortality and egg production of the Meadow Pipit with special reference to altitude. Bird Study, **3:** 119–132.—A publication based on the nest record card and banding schemes of the British Trust for Ornithology. Breeding is later in *Anthus pratensis* as altitude increases, one day for every 130 ft. Clutch size was 0.45 egg lower at 1000 ft. than it was at sea level. As altitude increased total nest predation decreased. The relation between these facts is discussed.—M. T. M.

CRAMP, S. 1955. The breeding of the Willow Warbler. Bird Study, **2:** 121–135.—A publication of the British Trust for Ornithology Nest Record Scheme, on *Phylloscopus trochilus*. Statistics of breeding season, clutch size, incubation and nestling periods, and hatching and nestling success are given.—M. T. M.

CRINGAN, A. T. 1957. Notes on the biology of the Red-necked Grebe in western Ontario. Canad. Field-Nat., **71:** 72–73.

CULLEN, E. 1957. Adaptations in the Kittiwake to cliff-nesting. Ibis, **99**: 275–302.—A comparison of the ecology and behavior of the cliff-nesting *Rissa tridactyla* with that of ground-nesting gulls shows that some characteristics of ground-nesting gulls have been lost in the Kittiwake, probably because of relaxed predation on the cliffs; additionally, many new adaptations can be seen in the Kittiwake and these clearly seem useful in cliff-nesting.—R. F. J.

CURIO, E. 1957. Austausch zweier ungleichaltriger Bruten des Trauerschnäppers (*Muscicapa h. hypoleuca* Pallas). Journ. für Ornith., **98**: 190–194.—Experimental exchange of nestlings of the Pied Flycatcher with a brood of different age. English summary.—H. C. M.

DAVIES, S. J. J. F., and C. H. F. ROWELL. 1956. Observations on the Redwing in Swedish Lapland. Bird Study, **3**: 242–248.—*Turdus musicus* were breeding commonly in the Selkavaare area of acid-heath-birch-forest, and among scattered birches. Intensive observations were made at one nest containing young.—M.T.M.

DEMENTIEV, G. P. 1957. On the Shaheen *Falco peregrinus babylonicus*. Ibis, **99**: 477–482.—Remarks on the morphology and general biology of *F. peregrinus* in Turkestan.—R. F. J.

DIXON, J. B., R. E. DIXON, and J. E. DIXON. 1957. Natural history of the White-tailed Kite in San Diego County, California. Condor, **59**: 156–165.—In southern California observations have been made of this species for more than twenty years during which time 130 occupied nests have been studied in 35 different localities. This report embodies data on food, nesting, incubation, young, hunting, and roosting. The principal food is *Microtus californicus;* usually four eggs are laid between February and July with the female alone incubating; the male catches food for the female and young; roosts of nonbreeding birds may contain as many as 39 kites.—D. W. J.

GOODBODY, I. M. 1955. The breeding of the Black-headed Gull. Bird Study, **2**: 192–199.—Clutch size was higher at the second colony which completed laying about nine days after the first colony.—M. T. M.

HARTMAN, F. A. 1957. Some additions to nesting data on Panamian birds. Condor, **59**: 269–271.—Four species are discussed.

KOENIG, L. 1956. Zum Vorkommen einiger Spinte zwischen Tessalit und Niamey (Französisch-Westafrika). Journ. für Ornith., **97**: 384–402.—Ecology and behavior of the Bee-eaters (*Meropidae*) of French West Africa.—H. C. M.

MYRES, M. T., and D. W. SNOW. 1955. The breeding of Blackbird, Song Thrush and Mistle Thrush in Great Britain, Parts I–III. Bird Study, **2**: 2–24, 72–84, 169–178.—This is one of a number of reports on material collected by the British Trust for Ornithology Nest Record Scheme. The survey is made on 9500 nests of three species. Information on the breeding season, clutch size, and nesting success is minutely analyzed by stages of the season, regions of the country, and in relation to weather changes. Differences in the breeding biology of the two main species are discussed.—M. T. M.

OWEN, D. F. 1956. The food of nestling Jays and Magpies. Bird Study, **3**: 257–265.—The plastic collar method of collecting food samples was used. Lepidopterous larvae, Diptera, Coleoptera, and spiders were the chief food of nestling Jays. *Garrulus glandarius* get food for their young from leaves of decidous trees instead of the forest floor which they use at other times. *Pica pica* continued to feed on the ground while they had young, but lepidopterous larvae, fallen from the trees, predominated as with Jays. For comparison with other species see Lockie (1955, Ibis, 97: 341–369).—M. T. M.

PEREYRA, J. A. 1956. Notas Biológicas sobre el Corbatita Común. Hornero, **10:** 140–142.—Observations on nesting of *Sporophila caerulescens caerulescens*, and on molt and color in captive adult and immature males. The cup-shaped nest, placed low in bushes or weeds, contains 2 to 4 eggs.

PLÓTNICK, R. 1956. Original comportamiento de un Caburé. Hornero, **10:** 171–172.—A clutch of 4 eggs of the small owl *Glaucidium nanum* King, found in an abandoned nest of the Hornero, *Furnarius rufus;* the female owl remained in the cavity when it was opened for observation.

ROBINSON, T. S. 1957. Notes on the development of a brood of Mississippi Kites in Barber County, Kansas. Trans. Kansas Acad. Sci., **60,** 174–180.—Location of nest, incubation, care of nest, growth of young, and food are described.

ROBSON, R. W. 1956. The breeding of the Dipper in North Westmorland. Bird Study, **3:** 170–180.—This paper describes subsidiary data collected during an ambitious four-year study of marked *Cinclus cinclus.* Population is higher in sandstone than limestone areas. Movements of five marked birds are described. 23 territories were measured. Of 37 nest sites, 22 were near human habitation. Over half of the nests were occupied two years running. Laying dates, clutch-size, breeding success, and mortality rate are given.—M. T. M.

ROLLIN, N. 1957. Incubation by drake Wood Duck in the eclipse plumage. Condor, **59:** 263–265.

SKUTCH, A. F. 1957. Life history of the Amazon Kingfisher. Condor, **59:** 217–229.—This is another of Skutch's excellent compilations of life history on tropical and subtropical birds. It contains details of food, voice, nest site, eggs, incubation, nestlings, and bathing. Similarities and differences are indicated between this form *(Chloroceryle amazona)* and other kingfishers.—D. W. J.

STEBBINS, R. C. 1957. A further observation on torpidity in the Poor-will. Condor, **59:** 212.

WESTERSKOV, K. 1956. Incubation temperatures of the Pheasant, *Phasianus colchicus.* Emu, **56:** 405–420.—Measurements were made by the use of potentiometers in three nests. The temperature of the bare brood-patch is 39.5° C. Air temperatures at the top of the eggs under the sitting hen rise slowly from 33° to 36° C (mean 35.1° C) during the incubation period. Air temperatures at the bottom of the eggs rise from 23° C to 26–27° C (mean 25° C), but are affected greatly by ground temperatures. The hen leaves the nest for about one hour each day, when the nest temperature drops to that of the atmosphere. The eggs are turned once an hour on an average during incubation.—F. M.

ZUBERBÜHLER, E. 1956. Dos nidos en situación anómala. Hornero, **10:** 175.—A nest of the Calandria, *Mimus saturninus,* on the ground; and one of the Misto, *Sicalis luteola,* built on an abandoned nest of the Chingolo, *Zonotrichia capensis.*

Management and Conservation

ANDERSON, W. 1957. A waterfowl nesting study in the Sacramento Valley, California, 1955. Calif. Fish and Game, **43:** 71–90.—Nine study plots, in different sections of the valley, yielded data on 333 duck nests (mostly Mallard). Of these nests, 38.4% hatched, 9.3% were deserted, and 52.3% were destroyed. Predation by mammals was the main cause of nesting losses. Data are presented for 150 Coot nests of which predators took 54.3%. Predator control by means of poison is suggested as a means of increasing duck production.—F. M.

EDITORIAL. 1955. Birds and nature reserves in Great Britain. British Birds, **48:** 517–522, (also 539–541).—A list of reserves of ornithological interest which will be

useful to visitors. The different implication of the word "conservation" in a crowded European country such as Britain becomes clear in the discussion of some of the current problems. The fundamental research which is the primary concern of the government Nature Conservancy is made plain.—M. T. M.

FRITH, H. J. 1957. Wild ducks and the rice industry in New South Wales. C. S. I. R. O. Wildlife Research, **2:** 32–50.—Grey Teal (*Anas gibberifrons*), Black Duck (*A. superciliosa*), and Wood Duck (*Chenonetta jubata*) cause some damage to rice crops. The food and feeding habits of these species are described and their economic significance is assessed in relation to climatic conditions, local movements, and rice-growing. On the whole, wild ducks are thought to be a minor pest to the rice-growing industry. The value of shooting and the importance of cultivation practices are discussed.—F. M.

HILDEBRAND, M. 1957. Determining the sex of dressed pheasants. Calif. Fish and Game, **43:** 131–137.—To enforce certain game laws, methods of sexing dressed birds are necessary. When urogenital structures are not present, any one of five bone measurements will almost always prove diagnostic.—F. M.

MIGRATION AND ORIENTATION

BROWN, R. G. B. 1955. The migration of the Coot in relation to Britain. Bird Study, **2:** 135–142.—Little is known about the migration of the common species *Fulica atra*. However in Europe there is a NE–SW standard direction in the fall, and some birds from the Continent winter in England. It is not known if British bred Coots ever travel to the Continent.—M. T. M.

CORNWALLIS, R. K. 1955. The pattern of migration in 1954 at the east coast Bird Observatories. British Birds, **48:** 429–446.—Fall migrants are drift migrants from the Continent, migrants from Greenland and Iceland, coastal passage migrants, and winter immigrants. Cyclonic drifts bring birds more frequently to the northern stations, possibly as these are islands with wide catchment areas. An unusual feature was that some cyclonic drifts originated on the west coast of Norway, rather than at the Skagerrak.—M. T. M.

DAVIS, P., and WEAVING, J. 1955. Movements of certain species at the Irish Sea Bird Observatories in 1954. British Birds, **48:** 523–532.

GOLDSMITH, T. H., and D. R. GRIFFIN. 1956. Further observations of homing terns. Biol. Bull., **111:** 235–239.—Terns from nesting colonies in Michigan and Massachusetts were liberated at an intermediate point at Cortland, New York. Both groups showed a tendency to head approximately southeast. Topography did not offer any apparent explanation for this orientation.—J. T. E.

HICKEY, J. J. 1956. Autumnal migration of ducks banded in Eastern Wisconsin. Trans. Wisc. Acad. Sci. Arts and Letters, **45:** 59–76.—An analysis of 1064 recovery reports of Mallards and a smaller number of ducks of other species banded at two stations in eastern Wisconsin showed a wide dispersal into the Canadian Provinces in spring. Large numbers wintered in Arkansas and Louisiana and a smaller number along the Atlantic Seaboard from Virginia to Florida.—J. T. E.

KRAMER, G. 1957. Experiments on bird orientation and their interpretation. Ibis, **99:** 196–227.—A review of the literature on bird orientation and a critical examination of the hypothesis of sun-arc navigation. The author believes the sun-arc hypothesis to be unjustified, but owns that no better explanation is as yet available.—R. F. J.

KRAMER, G., and U.v.ST. PAUL. 1956. Weitere Erfahrungen über den "Wintereffekt" beim Heimfindevermögen von Brieftauben. Journ. für Ornith., **97:** 353–370.—

Comparison of essentially identical releases of homing pigeons show that performance is much poorer in winter. The authors do not believe this to be due to the changes in landmarks, decrease in homing "drive," or temperature. The reason for poor performance, and the orientation mechanism itself, remain unknown. —H. C. M.

KRAMER, G., and U.v.ST. PAUL. 1956. Über das Heimfinden von Käfigtauben über Kurzstrecken. Journ. für Ornith., **97:** 371–376.—Pigeons which had spent their entire lives in an aviary were released at distances of 2.8 and 22 km. from home. The results were taken to indicate that these birds rely on some unknown system of orientation even at short distances.—H. C. M.

LACK, D. 1955. The summer movements of Swifts in England. Bird Study, **2:** 32–40.—Eighteen cases of summer movements of *Apus apus* are on record in England. Most were directed about SW into wind, and away from a depression. Movements ahead of thunderstorms are omitted. A decrease in airborne insects, or indirect weather signs may be the reason for such movements which have been reported from Fenno-Scandia, and also in British Columbia (*Nephoecetes niger*). —M. T. M.

LACK, D. 1956. Seaward flights of Swifts at dusk. Bird Study, **3:** 37–42.—Observations of *Apus apus* going out to sea at dusk on the east coast of England. These movements seem to be associated with weather movements, so that the birds seen were probably not local ones. A B.T.O. Enquiry is instituted.—M. T. M.

MEWALDT, L. R., and D. S. FARNER. 1957. Translocated Golden-crowned Sparrows return to winter range. Condor, **59:** 268–269.

MILLER, A. H. 1957. Migratory flight of a Zonotrichia at 10,000 feet above ground level. Condor, **59:** 209–210.

MOREAU, R. E. 1956. The Iberian Peninsula and migration. Bird Study, **3:** 1–25. —An important review of some 2000 banding recoveries in Spain and Portugal. With the exception of a tiny part of Spain, the whole area is west of the Greenwich Meridian, and birds have to fly SW. from their breeding areas to reach it. Birds passing on to tropical Africa anywhere east of Ghana must change direction upon leaving Iberia. Visible migration until recently was little known, but recent work by the Edward Grey Institute and others have increased our knowledge of this aspect of the problem. Some migrants move on a broad front, others are confined to west or east coasts. The hostile center of Spain seems to be avoided to a certain extent. Banding returns indicate that populations from different breeding areas may be concentrated on passage, or in winter, in different parts of the peninsula. There are some remarkable east–west movements in Europe. *Per contra* there is a considerable list of birds for which individuals marked on the continent have reached Iberia, whereas British-marked ones have not. There are large gaps in our knowledge.—M. T. M.

MOREAU, R. E., and J. F. MONK. 1957. Autumn migration in southwest Portugal. Ibis, **99:** 500–508.

NISBET, I. C. T. 1957. Passerine migration in south Scandinavia in the autumn of 1954. Ibis, **99:** 228–268.—Analysis of passerine migration in the Baltic–North Sea area indicates that these birds orient by day both by means of topographic features and position of the sun; by night there seems to be no true orientation, but nocturnal migrants seem to pick up position in the day-time following movement.—R. F. J.

NISBET, I. C. T., and T. C. SMOUT. 1957. Autumn observations on the Bosphorus and Dardanelles. Ibis, **99:** 483–499.—Observations on the migratory movements mainly of birds of prey.—R. F. J.

PRECHT, H., *et al.* 1956. Einige Versuche zum Heimfindevermögen von Vögeln. Journ. für Ornith., **97:** 377–383.—A series of miscellaneous experiments, some of which seem to indicate that gulls will orient towards home while confined in a small circular cage in a closed building.—H. C. M.

SPENCER, R. 1955. Report on bird-ringing for 1954. British Birds, **48:** 461–498.—Reports the banding in Great Britain in 1954 (102,858 birds were banded; Grand Total is now over 1¼ million). A select list of recoveries is given.—M. T. M.

SVARDSON, G. 1955. Crossbills in Sweden in 1953. British Birds, **48:** 425–428.—Few *Loxia curvirostra* bred in 1953 and their behavior that spring was indicative of poor food supply. In August, passage of birds from the east was as great as in 1927, 1930, and 1935.—M. T. M.

TUNMORE, B. G. 1956. The visual observation of night migration. Bird Study, **3:** 237–241.—Observations at Cambridge, of birds flying across the face of the moon at night. Lowery's (1951) methods of calculating compass bearings and the distribution of birds with altitude were found liable to error. Great Britain is generally too cloudy for such observations to be continuous.—M. T. M.

WAGNER, H. O. 1957. The technical basis of experimental research on bird migration. Ibis, **99:** 191–195.—Discussion of methods used to demonstrate *Zugunruhe* in caged migratory birds.—R. F. J.

PHYSIOLOGY

BARTHOLOMEW, G. A., T. R. HOWELL, and T. J. CADE. 1957. Torpidity in the White-throated Swift, Anna Hummingbird, and Poor-will. Condor, **59:** 145–155.—In this significant paper dealing with captive birds, the three species became torpid at about 2–3° C. (environmental temperature). Metabolic rate was considerably lower while the bird was torpid. Torpidity suggests energy conservation, and is related to hummingbirds' high metabolic rate when active and to survival of poor-wills and swifts when fasting.—D. W. J.

BLOUGH, D. S. 1957. Effect of lysergic acid diethylamide on absolute visual threshold of the pigeon. Science, **126** (3268): 304–305.

FISHER, H. I. 1957. Bony mechanism of automatic flexion and extension in the Pigeon's wing. Science, **126** (3271): 446.—Surgery was used to demonstrate that flexion and extension at the humeroulnar joint, through the action of the muscles of the upper arm, causes the same actions at the wrist.—J. C. H.

HERRICK, E. H., and J. O. HARRIS. 1957. Singing female canaries. Science, **125**(3261): 1299–1300.—Females treated with male sex hormone (testosterone phenylacetate) sang in a manner indistinguishable from that of a male bird.—J. C. H.

JENSEN, L. S., and W. E. MATSON. 1957. Enlargement of avian eye by subjecting chicks to continuous incandescent illumination. Science, **125:** (3251): 741.

SCHJEIDE, O. A., and M. R. URIST. 1956. Proteins and calcium in serums of estrogen-treated roosters. Science, **124** (3234): 1242–1244.

VÖLKER, O. 1957. Die Experimentelle Rotfärbung des Gefieders beim Fichtenkreuzschnabel (*Loxia curvirostra*). Journ für Ornith., **98:** 210–214.—Captive crossbills with yellow plumage resumed the normal red plumage when fed a diet containing rhodoxanthin, a pigment from the Yew (*Taxus baccata*).—H. C. M.

WALL, R. L., and H. G. SCHLUMBERGER. 1957. Electrophoresis of plasma proteins in the parakeet. Science, **125** (3255): 993–994.

WILSON, W. O., WOODARD, A. E., and H. A. B. PLANALP. 1956. The effect and after-effect of varied exposure to light on chicken development. Biol. Bull., **111:** 415–422.

Taxonomy and Palaeontology

Bergquist, H., and J. Lepiksaar. 1957. Medieval animal bones found in Lund. In, Archaeology of Lund. Studies in the Lund excavation material. **I:** 11–84.—Bones of goose, White-tailed Eagle, and a small variety of domestic fowl from sites dated from 1020 to 1400 A.D.

Gladkov, N. A. 1957. Der Rotkehlige Strandläufer (*Calidris ruficollis*) ist eine selbständige Art. Journ. für Ornith., **98:** 195–203.—Argues that *C. ruficollis* is specifically distinct from *C. minuta*. Presents data on courtship, nesting, plumage of young, and care of young.—H. C. M.

Hall, B. P. 1957. The taxonomic importance of variation in non-breeding plumage in *Aegithina tiphia* and *A. nigrolutea*. Ibis, **99:** 143–156.—Variation in the non-breeding plumage of these leafbirds necessitates naming of two new races (*A. t. deignani* and *A. t. cambodiana*).—R. F. J.

Haverschmidt, F. 1956. Was ist *Melanerpes hargitti* Dubois? Journ. für Ornith., **97:** 411–414.—The type of *M. hargitti* is actually an aberrant *M. cruentatus*. —H. C. M.

Kipp, F. A. 1956. Progressive Merkmale des Jugendkleides bei den Spechten. Journ. für Ornith., **97:** 403–410.—A phylogenic study of the juvenal plumages of European Woodpeckers.—H. C. M.

Lepiksaar, J. 1955. The bird remains from Vallhagar. *In*, Vallhagar, a migration period settlement on Gotland, Sweden: 814–831.—17 species identified from one site, 11 from another, include the domestic fowl.

Moore, R. T., and D. R. Medina. 1957. The status of the Chachalacas of western Mexico. Condor, **59:** 230–234.—A new subspecies, *Ortalis poliocephala lajuelae*, is described from Lajuela, Jalisco, Mexico. Based upon a study of specimens from western Mexico, the conclusion is reached that there should be four recognized forms of *Ortalis poliocephala: lajuelae, poliocephala, wagleri*, and *griseiceps*.—D. W. J.

Partridge, W. H. 1956. Variaciones Geográficas en la Lechuza Negra, *Ciccaba huhula*. Hornero, **10:** 143–146.—Two subspecies are recognized. *C. h. huhula* (Daudin) is found from Colombia, Venezuela, and the Guianas south, east of the Andes, to Bolivia, Mato Grosso, Maranhão and Piauí, Brasil. *C. h. albomarginata* (Spix), larger and darker, of southeastern Brasil, is recorded for the first time in Argentina, in Misiones.

Plótnick, R. 1956. Posición Sistemática del género *Heterospizias*. Hornero, **10:** 136–139.—Form of sternum, coracoid, furcula, and pelvis show that this hawk should be removed from the subfamily Accipitrinae to the Buteoninae.

Plótnick, R. 1956. Afinidad entre los generos *Elanus* y *Gampsonyx* (Accipitridae, Aves). Rev. de Investigaciones Agrícolas, **10** (3): 313–315. Buenos Aires.—The affinities of the monotypic neotropical Pearl Kite, *Gampsonyx*, have been in dispute. Peters, followed by Hellmayr and Conover, placed it in the Falconidae: Friedmann, in agreement with most of the earlier systematists, allocated it to the Accipitridae, in the subfamily Elaninae. On the basis of a number of characters Plótnick reaches the same conclusion as Friedmann.—E. E.

Snyder, L. L., and E. D. Lapworth. 1953. A comparative study of adults of two Canadian races of Red-wings. Canad. Field-Nat., **67:** 143–147.—An evaluation of the taxonomic characters of *Agelaius phoeniceus*, an exposition of their variability, and the determination of the geographic boundaries of two races in Ontario.—R. W. N.

WETMORE, A. 1957. The classification of the Oscine Passeriformes. Condor, **59:** 207–209.—On the basis of skeletal material (head of the humerus) Corvidae resemble closely nonpasserine orders (Piciformes, for example), and should, therefore, not be placed near the end of an arrangement of passerine families.—D. W. J.

WETMORE, A. 1957. A fossil rail from the Pliocene of Arizona. Condor, **59:** 267–268.—Description of a new species, *Rallus phillipsi*.

MISCELLANEOUS

ANON. 1956. Bird Watching in Europe. Bird Study, **3:** 81–85, 228–229.—A helpful guide to persons, places, and books for intending visitors.—M. T. M.

CAMPBELL, B. 1955. Ornithological Surveys of Nature Reserves, 1954. Bird Study, **2:** 84–86.—Reserves in England.—M. T. M.

COULSON, J. C., and E. WHITE. 1955. Abrasion and loss of rings among sea-birds. Bird Study, **2:** 41–44 (see also 2: 44–45, 98–100, 203.).—Abrasion and corrosion of bird bands, especially in contact with salt water, may be more serious than suspected. It is suggested that bands be retained on recovery, so that they may be surveyed to determine rate of wear. Separate collections of old, as well as new, alloy types are necessary. Without such preliminary calculations life-tables based on returns will be worthless.—M. T. M.

Editor: The Auk—

I am collecting information on the predatory or piratical habits of all birds whether crows, shrikes, hawks, skuas, etc. and should be grateful for detail of any exceptional or remarkable cases which have been observed. I do not want anything relating to recognized or normal procedure. I hope to publish these records in book form later on. Full acknowledgement will be given to contributors.—COL. R. MEINERTZHAGEN, 17 Kensington Park Gardens, London, W.11, England.

ERRATUM

The Auk, 74 (3):

p. 307, l. 7. After "Walkinshaw" omit "(males)"

NOTES AND NEWS

James L. Peters Bequest

James L. Peters, formerly President of the Union and one of its most distinguished Fellows, bequeathed one-seventh of his residual estate to the American Ornithologists' Union at the time of his death in 1952. The income is to be paid to his wife during her lifetime. Peters, a most devoted and most generous friend and selfless servant of the Union during his working life, has been elected posthumously a Patron of the Union by the Council.

The A.O.U. is particularly grateful for this sizable addition to its endowment in view of the increasing demands on the funds of the Union caused by its diversified activities. There would be many further opportunities for the A.O.U. in the field of publication, education, and cooperative research if the endowment income of the Union were greater.

The XIIth International Ornithological Congress will be held in Helsinki (Finland) June 5 to 12, 1958. The Congress is to take place in one of the residences of the Institute of Technology. The price of a room in the dormitories is about $2 per person per day, food not included. The Congress fee is $10. The prospectus, containing registration form and detailed information, will be distributed early in the autumn of 1957.

During the Congress two one-day excursions will be arranged. Before and after the Congress (May 31–June 4, and June 13–24) excursions will be arranged to representative places in the country, including its northernmost parts.

Applications to attend the Congress, and to contribute scientific papers, should be sent in before February 28, 1958, and addressed to the General Secretary, Dr. Lars von Haartman, Zoological Institute, University of Helsinki, Finland.

The Division of Biological and Medical Sciences of the National Science Foundation announces that the next closing date for receipt of basic research proposals in the life sciences is January 15, 1958. Proposals received prior to that date will be reviewed at the Winter meetings of the Foundation's Advisory panels and disposition will be made approximately four months following the closing date. Proposals received after the January 15, 1958, closing date will be reviewed following the Spring closing date of May 15, 1958.

Inquiries should be addressed to National Science Foundation, Washington 25, D. C.

A draft of the revised text of the International Code for Zoological Nomenclature is to be submitted to the Fifteenth International Congress of Zoology, to be held in London in July, 1958. In order to assist the Congress in the scrutiny of the draft of this code, the International Trust for Zoological Nomenclature has organized a colloquium to open July 9, one week prior to the opening of the Congress. Invitations to the Colloquium have been issued to many zoologists known to be interested in zoological nomenclature. Arrangements have been made to issue an invitation to the Colloquium to any member of the Congress who wishes to take part in the discussions. Inquiries should be sent to Francis Hemming, 28 Park Village East, Regent's Park, London N.W.1, England.

We regret to announce the death on August 11, 1957, of Sir Norman Boyd Kinnear, Honorary Fellow of the A.O.U.

OBITUARY

WALTER REGINALD BROOK OLIVER, Corresponding Fellow of the A.O.U. since 1923, and senior exponent of natural history in New Zealand, died at his home in Wellington, New Zealand, on May 16, 1957. He was known to all New Zealand biologists if only for the fact that he had, during his 73 years, delved into a great many aspects of natural history including the taxonomy and biogeography of plants, whales and seals, molluscs, and birds, living and fossil.

Dr. Oliver was born in Tasmania in 1883, and came to New Zealand at the age of 12 with his parents. From 1900 to 1920 he worked in the New Zealand Customs Department but was able, as his scientific writings show, to be active in natural history. After war service from 1915 to 1918, he joined the Dominion Museum, Wellington, in 1920 and was appointed Director in 1928. After his retirement in 1947 he spent a year as relieving Director of the Canterbury Museum, Christchurch.

Apart from his early, and fruitful, expedition to the Kermadec Islands in 1908, he took part in several expeditions notably to the Subantarctic Islands of New Zealand in 1927 and to the Fiordland District with the joint New Zealand-American Expedition of 1949. While closely associated with a number of scientific societies, reflecting his wide interests, his principal links were with the Royal Society of New Zealand which honored him with a Fellowship in 1927, and of which he was President from 1952 to 1954. He was President of the Royal Australasian Ornithologists' Union from 1943 to 1944, and his Presidential Address (Emu, **45**: 55–77, 119–152, 1945) is a landmark in the annals of "Australasian" ornithology. Dr. Oliver was known to visiting Americans as a Divisional Chairman of the Seventh Pacific Science Congress in New Zealand in 1949 and as leader of the New Zealand delegation to the Eighth Pacific Science Congress in Manila in 1953.

Although he was also a botanist of high standing, for which he was awarded the degree of D.Sc., he will best be remembered for his book on New Zealand birds which appeared in 1930 (reviewed in Auk, **48**: 300, 1931). It was pleasing that he was able to live to see the publication in 1955 of the second and much enlarged edition (reviewed in Auk, **73**: 563, 1956). Dr. Oliver's ideas on the classification of birds were unorthodox by the standards of the committee responsible for compiling the current *Checklist of New Zealand Birds* (1953). He did not hesitate to criticise the basis for the taxonomic principles involved, and his comments (Emu, **54**: 190–198, 1954) are worthy of the attention of compilers of similar lists. The second edition clearly shows his views and has brought adverse criticism from reviewers of the *Checklist* "school." Dr. Oliver is, however, the only man who has had the courage and energy, in the last eighty years, to produce and to revise such a necessary book. It already serves as the standard reference for all future studies on birds of this interesting region.

It was my privilege to know Dr. Oliver in my student days, and I, and the majority of the younger New Zealand biologists, owe him a great debt if only for providing a basis for our own future studies. I was fortunate to be able to participate in a number of field trips with him and then, as in the museum, he was ever ready to impart his knowledge, to encourage and to stimulate. He was glad to help when others were planning expeditions to areas in which he had worked or in which he had some special interest, and it was gratifying to his friends to see so many of their field notes from such trips put to good use in his books.—E. W. DAWSON.

THE INDEX

TO THIS VOLUME HAS BEEN REMOVED FROM THIS POSITION AND PLACED AT THE BEGINNING OF THE FILM FOR THE CONVENIENCE OF READERS.

Patrons, Fellows, Elective Members, and Members of the American Ornithologists' Union, 1957

PATRONS

Carnes, Mrs. Herbert E., 31 Dogwood Lane, Tenafly, New Jersey ..... (1944) 1955
Deane, Mrs. Ruthven, 830 Hubbard Road, Winnetka, Illinois ..... (1935) 1935
Greenewalt, Crawford H., Greenville, Delaware ..... (1956) 1957
Griscom, Ludlow, 21 Fayerweather St., Cambridge 38, Mass. 1957
Guernsey, Raymond G[ano], Eden Terrace, Poughkeepsie, New York (1928) 1955
Jennings, Mrs. B. Brewster, Box 666 Glen Head, Long Island, New York 1957
Lloyd, Hoyes, 582 Mariposa Ave., Ottawa, Ontario, Canada ..... (1916) 1945
McIlhenny, Edward Avery (deceased) ..... (1894) 1945
Merriam, Clinton Hart (Founder—deceased) 1937
Miller, Dr. Loye H[olmes], Museum of Vertebrate Zoology, Berkeley 4, California ..... (1918) 1957
Palmer, Dr. Theodore S[herman], (deceased) ..... (1888) 1956
Peters, James Lee (deceased) ..... (1904) 1956
Stone, Mrs. Witmer (deceased) ..... (1920) 1940
Stoner, Mrs. Dayton, 399 State St., Albany 1, New York ..... (1944) 1946
Tucker, Mrs. Carll, 733 Park Avenue, New York, New York ..... (1924) 1952
Van Tyne, Dr. J[osselyn], (deceased) ..... (1922) 1957
Wharton, William Pickman, Groton, Massachusetts ..... (1907) 1945

HONORARY FELLOWS

Bannerman, Dr. David A[rmitage], Boreland of Southwick, by Dumfries, Scotland ..... (1916) 1941
Berlioz, Dr. Jacques, Museum d'Histoire Naturelle, 55 rue de Buffon, Paris, France ..... (1923) 1938
Falla, Dr. Robert Alexander, Dominion Museum, Wellington, New Zealand ..... (1937) 1949
Ghigi, Prof. Alessandro, Direttore del Laboratorio de Zoologia applicata alla Caccia, Via S. Giacomo, 9 Bologna, Italy ..... (1921) 1949
Gyldenstolpe, Count Nils [Carl Gustaffersen], Naturhistoriska Riksmuseum, Vetenskapsakademien, Stockholm 50, Sweden ..... (1918) 1934
Haagner, Alwin Karl, P. O. Box 451, Pietermaritzburg, Natal, South Africa ..... (1916) 1918
Huxley, Dr. Julian Sorrell, 31 Pond Street, Hampstead, London, N. W. 3, England ..... (1941) 1955
Kuroda, Marquis Nagamichi, Fukuyoshi Cho, Akasaka, Tokyo, Japan (1918) 1921
Lack, Dr. David, Edward Grey Institute of Field Ornithology, Department of Zoological Field Studies, Botanic Garden, Oxford, England ..... (1939) 1946
Lorenz, Dr. Konrad Z., Max-Planck Inst. für Verhaltenphysiologie, Seewiesen, Post Landstetten über Starnberg, Oberbayern, Germany ..... (1938) 1951
Meinertzhagen, Col. Richard, 17 Kensington Park Gardens, London, W. 11, England ..... (1916) 1928
Moreau, Dr. R[eginald] E[rnest], The Yews, Berrick, near Benson, Oxon., England ..... (1938) 1949

Palmgren, Dr. P[ontus], Zoologiska Museet, N. Jarnvagsgatan 13, Helsingfors, Finland ..... (1932) 1946
Pinto, Dr. Oliverio Mario de Oliveira, Department of Zoology, Bureau of Agriculture, Industria e Comercio, São Paulo, Brazil ..... (1940) 1945
Salomonsen, Dr. Finn, Zoologisk Museum, Krystalgade, Copenhagen K. Denmark ..... (1949) 1953
Schüz, Dr. Ernst, Stattl, Museum für Naturkunde (14a), Stuttgart 0, Germany ..... (1938) 1953
Stresemann, Prof. Dr. Erwin, Berlin-Charlottenburg, Wandalenallee 38, Germany ..... (1922) 1930
Thomson, Sir A[rthur] Landsborough, 42 Girdwood Rd., Southfields, London, S. W. 18, England ..... (1922) 1951
Yamashina, Dr. Yoshimaro, Yamashina Museum, 49 Nanpeidai-Machi, Shibuya-ku, Tokyo, Japan ..... (1927) 1953

CORRESPONDING FELLOWS

Alexander, Wilfrid B[ackhouse], Department of Zoological Field Studies, Edward Grey Institute, Botanic Gardens, Oxford, England 1921
Ali, Salim A., 33 Pali Hill, Bombay Suburban District, Bandra, India (1944) 1948
Armstrong, Rev. E[dward] A[llworthy], St. Mark's Vicarage, Barton Road, Cambridge, England 1951
Baxter, Miss Evelyn Vida, The Grove, Upper Largo, Fifeshire, Scotland 1919
Beaufort, Dr. Lieven Ferdinand De, De Hooge Kley, Amersfoort, Netherlands 1926
Belcher, Sir Charles Frederic, 850 Hope St., Kokstad, C.P., South Africa 1934
Benson, C. W., c/o Game and Tsetse Department, P. O. Box 1, Chilanga, Northern Rhodesia 1954
Bertoni, Dr. Arnoldo De Winkelreid, Puerto Bertoni, Paraguay, South America 1919
Bourlière, Prof. F., Faculté de Médecine de Paris, Laboratoire de Biologie, 45 rue des Saints Pères, Paris 6e, France 1954
Bryant, Charles Ernest William, 394–396 Collins St., Melbourne, Australia .. 1949
Chisholm, Alexander Hugh, Angus & Robertson, Ltd., 89 Castlereagh St., Sydney, Australia 1922
David-Beaulieu, André Château Coutet, Saint-Emilion (Gironde), France .. 1949
De Lavalle, Jose Antonio, Lima, Peru 1925
Dementiev, Prof. Georges, Zoological Museum, Moscow Government University, Moscow 9, U.S.S.R. 1934
Drost, Dr. Rudolf, (23) Wilhelmshaven, Danziger Strasse 26, Germany 1934
Dugand, Prof. Armando, c/o Roncallo Hermanos, Apartado Aereo 85, Barranquilla, Colombia, South America 1952
Engelbach, Dr. Pierre, 10 rue Copernic, Paris XVI^e, France 1949
Fisher, James [Maxwell McConnell], Old Rectory, Ashton, Northampton, England 1951
Gibson-Hill, Carl Alexander, Raffles Museum, Singapore, Malaya 1951
Goodall, J[ack] [William] D[avies], Casilla 2238, Santiago, Chile 1952
Grant, Claude H[enry] B[axter], 8 Cornwall Gardens Court, 50 Cornwall Gardens, London, S. W. 7, England 1920
Groebbels, Dr. Franz, Physiologischer Institut Krankenhaus, Hamburg, Eggendorf, Germany 1933
Haverschmidt, F[rançois], P. O. Box 644, Paramaribo, Surinam, (Dutch Guiana) ..... (1928) 1950

Hindwood, K. A., Wingello Place, Angel Place, Sydney, New South Wales .. 1938
Hoesch, Walter, P. O. Box 110, Okahandja, South Africa 1957
Ingram, Collingwood, The Grange, Benenden, Cranbrook, Kent, England .. 1920
Iredale, Tom, c/o Australian Museum, Sydney, New South Wales 1918
Johansen, Dr. Hans, Zoological Museum, University of Copenhagen, Copenhagen, Denmark 1955
Johnson, Alfred William, Casilla 327, Santiago, Chile ..... (1950) 1952
Junge, G. C. A., Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands 1939
Kluyver, H. N., Instituut voor Oecologisch Onderzock, Arnhem, Netherlands 1956
Kramer, Dr. Gustav, Max-Planck Institut für Meeresbiologie, (23) Wilhelmshaven, Germany 1951
Laubmann, Dr. Alfred, (13b) München 9, Karolingerstrasse 18/11, Bayern, Germany 1923
MacDonald, James David, British Museum (Natural History), Cromwell Road, London, S. W. 7, England 1949
Marshall, Dr. A. J., Department of Zoology & Comparative Anatomy, St. Bartholomew's Medical College, University of London, London, England 1955
Mayaud, Noël, 80 rue du Ranelagh, Paris XVI, France 1949
Meise, Dr. Wilhelm, Bornplatz 5, Hamburg 13, Germany 1938
Moltoni, Dr. Edgardo, Direttore del Museo Civico, Corso Venezia 55, Milano, Italy 1936
Momiyama, Toku Taro, 1146 Sasazka, Yoyohata-mati, Tokyo, Japan 1925
Nicéforo María, Hermano, Museo del Instituto de LaSalle, Calle 11, No. 1.69, Bogotá, Colombia 1921
Nicholson, Edward M., 13 Upper Cheyne Row, London, S. W. 3, England 1954
Niethammer, Dr. Günter, Dozent; Koblenzer Str. 162, (22c) Bonn, West Germany 1957
Philippi B., Rodulfo Amando, Tobalaba 157, Santiago, Chile ..... (1941) 1952
Phillips, William W. A., "Tonacombe," Namunukula, Ceylon 1956
Rensch, Dr. Bernhard, Zoologisches Institute der Westfalischen Landes-Universität, Bade-Str. 9, (21a) Münster (Westf.), Germany 1932
Richdale, Lancelot E[ric], 23 Skibo St., Kew, Dunedin, New Zealand .. (1943) 1947
Sassi, Dr. Moriz, Naturhist. Museum, Burgring 7, Vienna 1, Austria 1934
Schouteden, Dr. H., Musée du Congo Belge, Tervuren, Belgium 1934
Scott, Peter Markham, The Wildfowl Trust, New Grounds, Slimbridge, Gloucestershire, England 1955
Serventy, Dr. D[ominick] L., Wildlife Survey Section, C.S.I.R.O., West. Australia Regional Lab., University Grounds off Myers St., Nedlands, Western Australia 1949
Seth-Smith, David W[illiam], 69 Palace Court, London, W. 2, England 1920
Skead, C. J., Kaffrarian Museum, King Williams Town, Cape Province, Union of South Africa 1955
Skovgaard, Peter, Viborg, Denmark 1926
Stegmann, Dr. Boris Charles, Zoological Museum, Academy of Science, Leningrad, U.S.S.R. 1932
Stoneham, Lieut-Col. Hugh Frederic, O.B.E., Director of the Stoneham Museum and Research Centre, Kitale, Kenya Colony, British East Africa 1930
Taka-Tsukasa, Prince Nobusuka, 87 Yoyogi-Sanyacho, Shibuya-Ku, Tokyo, Japan 1924

Thorpe, William H., Department of Zoology, University of Cambridge, Cambridge, England 1956
Ticehurst, Norman Frederic, Spots House, Small Hythe, Tenterden, Kent, England 1918
Tinbergen, Dr. Nicholas, Department of Zoology, University Museum, Oxford, England 1938
Uchida, Dr. Seinosuke, No. 8 Aobachs, Shibuyaku, Tokyo, Japan 1919
Van Someren, Dr. Victor Gurnet Logan, Box 658, Nairobi, Kenya Colony, British East Africa 1921
Verheyen, Rene K., Kolonielaan 87, Antwerpen, Belgium 1954
Vincent, Jack, "Firle," P. O. Box 44, Mooi River, Natal, South Africa 1949
von Haartman, Baron Lars, Zoological Institute, University of Helsingfors, Norra Jarnvagsgatan 13, Finland 1954
Wagner, Dr. Helmuth O., Übersee Museum, Bremen, Germany ..... (1945) 1950
White, C. M. N., c/o the Secretariat, Lusaka, N. Rhodesia ..... (1941) 1956
White, Capt. Samuel Albert, Wetunga, Fulham, South Australia 1919

FELLOWS, ELECTIVE MEMBERS, AND MEMBERS

Abbott, Jackson Miles, 814 13th St., New Alexandria, Virginia 1946
Abraitys, Vincent [Valent], Sergeantsville, New Jersey 1950
Abramson, Ira Joel, B 205 Presidential Apts., Philadelphia 31, Pennsylvania 1956
Adams, Capt. Claude T., Sr., W.A.D.C. Area B, Box 8607, Wright-Patterson AFB, Ohio 1956
Adams, Heman Purdy, 218 Main St., Glenville, West Virginia 1954
Adams, Laura [Louise] C., Andrews, South Carolina 1950
Adams, William Hensley, Jr., Wildlife Research Unit, Wildlife Building, Auburn, Alabama 1949
Adelson, Richard, 34 Wensley Dr., Great Neck, Long Island, New York 1937
Adler, Max E., 612 Arlington Rd., Bangor, Michigan 1956
Agey, H[oite] Norton, 908 Ave. H. N. E., Winter Haven, Florida .. 1957
Albert, Richard Orvil, 1313 Roosevelt Blvd., Alice, Texas 1954
Albright, Ray, Rt. 1, Box 277, Dayton, Oregon 1952
Alcorn, Albert A., 45 W. Fairview, Fallon, Nevada 1952
Alcorn, Dr. Gordon D., College of Puget Sound, Tacoma 6, Washington 1952
F Aldrich, Dr. John Warren, 21 W. Spring St., Alexandria, Virginia (1929) 1947
Alexander, Donald C[hild], 16 Pleasant St., Nahant, Massachusetts .. 1936
Alexander, Dr. [Edward] Gordon, Department of Biology, University of Colorado, Boulder, Colorado 1919
Alexander, R[obert] C[ampbell], 19207 Charleston Ave., Detroit, Michigan 1942
Allard, H[arry] [Ardell], 3000 7th St., North, Arlington 1, Virginia .. 1929
F Allen, Dr. Arthur A[ugustus], Fernow Hall, Cornell University, Ithaca, New York ..... (1909) 1922
EM Allen, Dr. Elsa G[uerdrum], Cornell University, Ithaca, New York (1935) 1947
Allen, Miss Esther C[ampbell], Camarillo State Hospital, Camarillo, California 1949

Allen, Frederick W[illiam], Jr., c/o The Yankee Traveler, Route 3, Plymouth, Massachusetts 1951
F Allen, Robert Porter, Tavernier, Florida ..... (1933) 1955
Allen, Walter Fox, 93 Maplewood Avenue, Maplewood, New Jersey .. 1925
EM Allin, Dr. Albert E[llis], Provincial Health Laboratory, Fort William, Ontario, Canada ..... (1939) 1955
Allis, Cdr. Frederick Ashton, U.S.N., Office of Naval Materiel, Main Navy Building, Washington, D. C. 1953
Allison, Sidney J[ob], 161 Harington Drive, Nottingham, England .. 1950
Almon, Dr. Lois, Box 235, Experiment Station, State College, Mississippi 1948
Alperin, Irwin M., 187 Cedar Lane, Babylon, New York 1939
Altemus, Edward L[ee], Lafayette Ave., Fort Washington, Pennsylvania 1952
Altmann, Martin R., 131 Marlborough, Boston, Massachusetts 1955
Altsheler, Kathryn B. [Mrs. Yancey R.], 2326 Dundee Road, Louisville 5, Kentucky 1955
EM Alvarez del Toro, Miguel, Apartado Postal No. 6, Tuxtla Gutierrez, Chiapas, Mexico ..... (1947) 1953
F Amadon, Dr. Dean, American Museum of Natural History, Central Park West at 79th St., New York 24, New York ..... (1930) 1949
Ames, 2/Lt. Peter L[esley], 741 Concord Ave., Belmont, Massachusetts 1954
Ames, Miss Rosella S[prague], Moraine St., Marshfield, Massachusetts 1940
Amman, Gene Doyle, 850 West Lake St., Fort Collins, Colorado 1957
Anaka, William, Spirit Lake, Sask., Canada 1956
Anderson, Allen E[ugene], Apt. 37, Orchard Park, Dexter, New Mexico 1954
EM Anderson, Anders Harold, 3221 Kleindale Rd., Tucson, Arizona (1939) 1950
Anderson, Earl A[xel], 7335 N. Odell Ave., Chicago 31, Illinois 1950
Anderson, Frank G., Department of Sociology, University of Maryland, College Park, Maryland 1951
Anderson, G[eorge] Arthur, 601 E. Wapello St., Altadena, California 1949
Anderson, Dr. George Edwin, 408 Shearer Building, Bay City, Michigan 1939
Anderson, John M., Winous Point Club, Port Clinton, Ohio 1938
Anderson, Kathleen Shaw, R. F. D. #2, Winter St., Middleboro, Massachusetts 1954
Anderson, Richard A., 1147 Grenshaw, St. Louis 15, Missouri 1953
EM Anderson, Rudolph M[artin], 58 Driveway, Ottawa, Ontario, Canada (1907) 1914
Anderson, Sydney, Museum of Natural History, Lawrence, Kansas 1955
Andrews, Arthur Allen, 75 Penfield Crescent, Brighton Station, Rochester 10, New York 1924
Andrews, Mrs. J. Clinton, 3 Stone Alley, Nantucket, Massachusetts .. 1957
Andrews, Mrs. Lydia G[oehmann], 18 Church St., West Boylston, Massachusetts 1949
Andrews, Sara Bache [Mrs. Charles B.], 53 Center Street, Clinton, New Jersey 1947
Andrle, Robert F., 17 Crescent Ave., Buffalo 14, New York 1954
Angell, LeRoy E., Route 1, Mankato, Minnesota 1952

Anglin, James P., 957 Dunsmuir Road, Town of Mount Royal, Quebec, Canada 1943
L Annan, Ormsby, 1059 Chatfield Rd., Winnetka, Illinois 1950
Anthes, Clarence A[lvin], 707 N. Moreland Blvd., Waukesha, Wisconsin 1937
Anthony, Jesse D., 722 1st Avenue, East, Grand Rapids, Minnesota .. 1954
Antoniazzi, John F[rancis], Bayberry Lane, Westport, Connecticut .. 1950
Apfeld, Albert L., South Green St., Tuckerton, New Jersey 1953
Appleberry, Mrs. Edna Lanier, 5 Lake Forest Parkway, Wilmington, North Carolina 1947
Applegate, Wilson G. Hunt, Rhinebeck, New York 1934
EM Arbib, Robert S[imeon], Jr., 9756 W. Olympic Blvd., Beverly Hills, California ..... (1947) 1955
Archbold, Richard, Archbold Biological Station, Route 1, Box 173, Lake Placid, Florida 1930
Arend, Philip H[anford], 21 Buena Vista, Novato, California 1952
Argue, Arthur W., 1040 Boylston St., Boston, Massachusetts 1946
Armitage, Kenneth B[arclay], Department of Zoology, University of Kansas, Lawrence, Kansas 1952
Armitt, H[erbert], T[homas], 902 Westwood Ave., Westwood, New Jersey 1950
Armstrong, Miss Virginia, Old Concord Rd., South Lincoln, Massachusetts 1937
Arnett, Dr. John H[ancock], Jr., Harrisburg State Hospital, Harrisburg, Pennsylvania 1946
Arnold, Elting, 4914 Dorset Avenue, Chevy Chase 15, Maryland 1934
Arny, Samuel A[ndrew], Apartment 2, 6515 Willston Drive, Falls Church, Virginia 1952
Ashley, Lt. Donn L., Public Works Department, U. S. Naval Training Center, Bainbridge, Maryland 1954
Ashton, Randolph, 800 Crown St., Morrisville, Pennsylvania 1938
Atkins, Dr. Elisha, Westward Rd., Woodbridge, Connecticut 1946
Atsatt, Dr. Sarah R., 1130 N. Monterey, Alhambra, California 1947
Austin, Amalie A., 99 May Street, New Britain, Connecticut 1956
Austin, Mrs. Enid K., 1116 Mandana Blvd., Oakland 10, California .. 1947
Austin, John Brander, School of Theology, University of The South, Sewanee, Tennessee 1947
F Austin, Dr. Oliver Luther, Jr. Department of Biology, University of Florida, Gainesville, Florida ..... (1925) 1948
EM Austin, Dr. Oliver Luther, Sr., P. O. Box 146, Tuckahoe, Westchester County, New York ..... (1930) 1940
Avent, Miss Carrie, Minter City, Mississippi 1954
EM Axtell, Dr. Harold H[amilton], Buffalo Museum of Science, Buffalo 11, New York ..... (1941) 1951
Babcock, Charles D., 36th St. and Woodland Ave., Reading, Pennsylvania 1953
Babcock, Rev. Fred I[rving], Land O'Lakes, Wisconsin 1951
Bacon, Francis L[lewellyn], 22 Waterman Ave., Philadelphia 18, Pennsylvania 1917
Badaracco, Robert Jack., 2580 Polk Street, San Francisco, California .. 1957

Badger, Lester R., Excelsior Rt. 1, Minnesota 1957
Baepler, Donald H., Department of Zoology, University of Oklahoma, Norman, Oklahoma 1955
Baer, Myrtle W., 1237 North Jefferson St., Milwaukee 2, Wisconsin .. 1942
EM Baerg, Dr. William J., College of Agriculture, University of Arkansas, Fayetteville, Arkansas ..... (1924) 1952
LEM Bagg, Aaron Moore, Farm Street, Dover, Massachusetts ..... (1946) 1951
F Bailey, Alfred M[arshall], Colorado Museum of Natural History, Denver, Colorado ..... (1918) 1941
Bailey, Joe H[arden], Box 393 W. T. Station, Canyon, Texas 1955
L Bailey, John Wendell, 27 Willway Rd., Richmond 21, Virginia 1925
Bailey, Richard, 1107 High Court, Berkeley 8, California 1954
EM Baillie, James L[ittle], Jr., Royal Museum of Zoology and Paleontology, 100 Queen's Park, Toronto, Ontario, Canada .... (1923) 1935
Baird, James, Norman Bird Sanctuary, Paradise Rd., Newport, Rhode Island 1947
EM Baker, John Hopkinson, National Audubon Society, 1130 5th Ave., New York 28, New York ..... (1911) 1949
Baker, Dr. Maurice F., 19 Austinville Road, Decatur, Alabama 1954
L Baker, Miss Mildred E., 275 Hillcrest Drive, Rt. 1, Encinitas, California 1947
Baker, Paul S., 21 Woodlot Lane, Huntington, Long Island, New York 1944
EM Baker, Dr. Rollin Harold, The Museum, Michigan State University, East Lansing, Michigan ..... (1939) 1950
Baker, William Calvin, 559 Euclid St., Salem, Ohio 1930
Bakus, Gerald Joseph, 13 Cascade Street, Missoula, Montana 1957
Balch, Francis N[oyes], 130 Prince St., Jamaica Plain, Massachusetts 1946
Baldwin, Mrs. Harry Leverett, 6335 Kimbark Ave., Chicago 37, Illinois 1924
EM Baldwin, Dr. Paul H., Department of Zoology, Colorado A. and M. College, Fort Collins, Colorado ..... (1947) 1953
Baldwin, Dr. William Grove, Department of Otolaryngology, University of Iowa Hospital, Iowa City, Iowa 1953
Baldwin, William P[lews], Jr., Rt. 1, Box 102-E, Summerville, South Carolina 1937
Ball, Dr. Kathleen E., 11719 - 133 St., Edmonton, Alberta, Canada .. 1946
Ball, Robert E[dwin], 5037 Meadow Lane N.W., Canton 9, Ohio ... 1938
Ball, Stanley [Crittenden], Peabody Museum of Natural History, Yale University, New Haven, Connecticut 1942
Ballard, Mrs. Buena B., 612 N. 25th Ave., Hattiesburg, Mississippi .. 1955
Balsom, Mrs. Amos P., 2209 E. Stratford Court, Milwaukee 11, Wisconsin 1947
Banks, Richard C[harles], Museum of Vertebrate Zoology, Berkeley 4, California 1957
Banta, Edna, Mary Gray Bird Sanctuary, R. R. 6, Connersville, Indiana 1954
Bantly, Harold Arthur, 3017 Main Street, Glastonbury, Connecticut .. 1957
Barbehenn, Kile R., 7114 Sellers Ave., Upper Darby, Pennsylvania .. 1954
Barber, D[avid] H[enry], Castleton, Mells, Frome, Somerset, England 1948
Barber, Herb[ert] K[neeshaw], 22 North 4th St., Niles, Michigan .. 1953
Barber, Yates Middleton, Jr., U. S. Fish and Wildlife Service, 2404½ Hillsboro St., Raleigh, North Carolina 1948

Barbour, Dr. Roger W., Department of Zoology, University of Kentucky, Lexington, Kentucky 1937
Barkalow, Frederick S[chenck], Jr., 2510 Wade Ave., Raleigh, North Carolina 1938
Barlow, Henry Hoyt, R. D. 1, Califon, New Jersey 1954
Barnard, Ellsworth, 86 Federal St., Brunswick, Maine 1949
HL Barnes, Claude Teancum, 359 Tenth Ave., Salt Lake City, Utah 1908
Barnes, Mrs. Ruth, 173 Myrtle St., Shelton, Connecticut 1944
Barrett, Charles H[oratio] M[atchett], 1339 Valley Place, S.E., Washington 20, D. C. 1912
Barrett, Vernon, 1300 Chelten Way, South Pasadena, California 1955
Barry, Thomas W[oodams], 102 Grandview Court, Ithaca, New York 1954
Bartel, Karl E[mil] [Edgar], 2528 W. Collins St., Blue Island, Illinois 1954
Barth, Dr. Edvard K., Zoological Museum, Sarsgt. 1. Oslo 47, Norway 1957
Barth, R. H., Jr., Biological Laboratories, Harvard University, Cambridge 38, Massachusetts 1957
EM Bartholomew, Dr. George A[delbert], Jr., Department of Zoology, University of California, Los Angeles 24, California ..... (1941) 1949
Bartleson, Fred D., Jr., 3815 McGregor Blvd., Ft. Myers, Florida ... 1952
Bartlett, Guy, 1053 Parkwood Blvd., Schenectady 8, New York 1932
Bartlett, Dr. L[awrence] M[atthews], Zoology Department, University of Massachusetts, Amherst, Massachusetts 1952
Barton, Roger Avery, 22 Arlington Ave., Caldwell, New Jersey 1952
Bartram, Edwin B[unting], Bushkill, Pike Co., Pennsylvania 1913
EM Bartsch, Dr. Paul, Lebanon, Gunston Hall Rd., Lorton, Virginia (1896) 1902
Baskett, Dr. Thomas S[ebree], Missouri Coop. Wildlife Research Unit, Wildlife Conservation Bldg., University of Missouri, Columbia, Missouri 1946
Basner, Harry, Mountaindale, New York 1927
Bastin, Eric W[alter], 43 Inglewood Drive, Apartment 2, Hamilton, Ontario, Canada 1951
Bates, Curtis E., 609 Elm St., Rome, New York 1946
Bates, Cyril D., Box 1238, Dauphin, Manitoba, Canada 1953
Batson, Jackie David, 1909 Highland Ave., Knoxville, Tennessee .. 1957
L Batts, H[enry] Lewis, Jr., 1211 Glenwood Ave., Kalamazoo, Michigan 1948
Baumel, Julian J., Department of Anatomy, School of Medicine, Creighton University, Omaha, Nebraska 1951
Baumgarten, Dr. Henry E[rnest], Avery Laboratory, University of Nebraska, Lincoln 8, Nebraska 1953
EM Baumgartner, Dr. Frederick M[ilton], Department of Zoology, A. and M. College, Stillwater, Oklahoma ..... (1930) 1953
EM Baumgartner, Dr. Marguerite Heydweiller, [Mrs. Frederick M.], R. R. 3, Stillwater, Oklahoma ..... (1930) 1945
Baxter, William, R. R. 2, Middleton, Delaware 1950
Bayley, Bob, 1759 Franklin Blvd., Eugene, Oregon 1956
Beacham, Miss Addie E., c/o Mrs. W. D. McDavid, 220 E. Mandalay Drive, San Antonio, Texas 1956
Beacham, [Edward] Derek, 342 - 42nd. St., S.W., Calgary, Alberta, Canada 1948

Beadel, Henry Ludlow, Route 1, Box 160, Tallahassee, Florida 1926
Beal, George, 1009 Pegg Rd., East Point, Georgia 1954
Beall, Bernard William, 2204 Hendricks, Fort Smith, Arkansas 1954
Beals, Edward [Wesley], 721 Clark Ct., Madison, Wisconsin 1950
Beardslee, Clark Smith, 132 McKinley Avenue, Kenmore, New York 1930
Beargie, Mrs. Herbert [Kathleen B.], 190 Campo St., Chaffee Station, Denver, Colorado 1955
Beasley, Ray J[ackson], P. O. Box 117, Newport News, Virginia ... 1947
Beattie, J[ohn] I[nnes], 206 Worcester Lane, Waltham, Massachusetts 1951
Beaudette, Palmer T[hayer], Box 228, RFD #1, Solvang, California 1956
Bechtel, K. K., 155 Sansome Street, San Francisco 4, California 1956
EM Beck, Herbert H[uebener], 515 N. President Ave., Lancaster, Pennsylvania ..... (1931) 1954
Becker, Miss Edna E., 101 High St., Middletown, Connecticut 1947
Beckett, Joseph Vern, 2554 Fourth Street, Cuyahoga Falls, Ohio ... 1957
Beckett, Kenneth Raymond, 2329 Scott Street, Victoria, B. C., Canada 1957
Beddall, Mrs. Barbara G., 2502 Bronson Rd., Fairfield, Connecticut 1953
L Bedell, Laurel May [Mrs. Harry M.], 1620 Massachusetts Ave., N.W., Washington 6, D. C. 1929
F Beebe, Dr. [Charles] William, New York Zoological Park, New York 60, New York ..... (1897) 1912
Beecher, Mrs. Barbara J., 330 Elm St., Bennington, Vermont 1956
EM Beecher, William John, Chicago Natural History Museum, Roosevelt Rd. and Field Drive, Chicago 5, Illinois ..... (1937) 1950
Beer, James R[obert], Division of Entomology and Economic Zoology, University of Minnesota, St. Paul 1, Minnesota 1939
F Behle, Dr. William H[arroun], Department of Biology, University of Utah, Salt Lake City, Utah ..... (1934) 1951
Behrend, Fred William, 607 Range St., Elizabethton, Tennessee 1954
Beidleman, Dr. Richard G[ooch], Biology Department, University of Colorado, Boulder, Colorado 1948
Belcher, Dr. Paul E[ugene], 230 Mineola Ave., Akron 13, Ohio 1937
L Belknap, John Balcom, 92 Clinton St., Gouverneur, New York 1927
EM Bellrose, Frank C., Jr., 334 E. Adams St., Havana, Illinois .... (1934) 1947
L Belt, Charles B[anks], 233 Broadway, New York 7, New York 1950
Belton, William, Embassy Santiago, c/o Department of State, Washington 25, D. C. 1947
Bemont, Leslie E[dward], 710 University Ave., Endwell, New York .. 1953
Bender, Richard O[liver], RD #1, Bridgeton, New Jersey 1957
Bennett, Cha[rle]s H[erbert], 80 Belmont Ave., Ottawa, Ontario, Canada 1948
Bennett, George, Stillwater Cove Ranch School, Jenner, California 1957
Bennett, Gerald M., 1030 Ontario St., Cobourg, Ontario, Canada .. 1955
Bennett, Joseph A[lexander], Jr., 28 Berkeley Rd., Maplewood, New Jersey 1951
EM Bennett, Dr. Logan J[ohnson], Pennsylvania Game Commission, Harrisburg, Pennsylvania ..... (1934) 1946
Bennett, Walter Waldo, 7828 Santa Monica Blvd., Hollywood 46, California 1924
Benson, Dr. Seth B[ertram], 645 Coventry Rd., Berkeley 7, California 1928

Bent, George Payne, II, Lake Ave., Greenwich, Connecticut 1950
Benton, Dr. Allen H[aydon], New York State College for Teachers, Albany, New York 1949
EM Berger, Dr. Andrew J[ohn], Department of Anatomy, East Medical Building, University of Michigan, Ann Arbor, Michigan (1948) 1952
Berger, Daniel D[avid], 510 E. MacArthur Rd., Milwaukee 17, Wisconsin 1954
LEM Bergstrom, E[dward] Alexander, 37 Old Brook Rd., W. Hartford 7, Connecticut ..... (1939) 1954
Berkey, Glenn L[eroy], 29 South Main St., Rittman, Ohio 1949
Berkowitz, Albert C[larence], 517 58th St., Des Moines 12, Iowa ... 1948
Bernath, Ernest L., Casilla 13198, Santiago de Chile 1955
Berrett, Delwyn Green, Menan, Idaho 1957
L Berry, William David, 1272 Justin Ave., Glendale 1, California 1954
Beveridge, Charles L., 934 Missoula Ave., Helena, Montana 1957
Bevis, Frederick B., 1298 Westwood, Birmingham, Michigan 1956
EM Biaggi, Dr. Virgilio, Jr., Biology Department, University of Puerto Rico, College of Agriculture and Mechanical Arts, Mayaguez, Puerto Rico ..... (1944) 1957
Bialac, James T[homas], 4706 No. 16th Dr. #4, Phoenix, Arizona .. 1956
L Bigelow, Mrs. Archibald Pierce, 270 Wayne Ave., Oakland, California 1919
Biggs, Osco E., Box 122, St. Charles, Illinois 1957
Bilby, H. A., 2 Sunnyside Cottages, High Street, Harlington, Hayes, Middlesex, England 1947
Binder, Miss Kay, 3838 W. 61st. St., Chicago, Illinois 1957
Binford, Laurence C[harles], 330 Grove St., Glencoe, Illinois 1954
Bingham, Dr. Millicent Todd, 1661 Crescent Place, Washington 9, D. C. 1949
Bingham, Richard S[tephen], Jr., The Circle, Lewiston, New York 1955
Bird, Charles D., Botany and Plant Pathology Department, Oklahoma A. and M. College, Stillwater, Oklahoma 1956
Birkeland, Henry, Roland, Iowa 1933
Biswas, Biswamoy, Zoological Survey of India, Indian Museum, Calcutta 13, India 1948
Black, Dr. C[harles] Theodore, R.R. 1, Box 480, East Lansing, Michigan 1933
Blackstone, Robert E[dward], 10363 Calvin Ave., Los Angeles 25, California 1954
HL Blackwelder, Eliot, P. O. Box N, Stanford, California 1895
Blades, Mrs. Herbert [C. Dorothy], 1708 W. Gilpin Dr., Willow Run, Wilmington 5, Delaware 1955
LEM Blain, Dr. Alexander William, 1028 Berkshire Rd., Grosse Point Park 30, Michigan ..... (1902) 1953
EM Blake, Dr. Charles H[enry], P. O. Box 613, Hillsboro, North Carolina (1946) 1950
F Blake, Emmet Reid, Chicago Natural History Museum, Roosevelt Road and Field Drive, Chicago 5, Illinois ..... (1933) 1952
Blake, Dr. Sidney Fay, 3416 North Glebe Rd., Arlington, Virginia .. 1923
Blanchard, Harold H[ooper], 32 Calumet Rd., Winchester, Massachusetts 1939

Blatchley, Miss Myrtice A., 25 Howard Parkway, New Rochelle, New York 1956
L Blauvelt, Hiram B. D., 637 Kinderkamack Rd., Oradell, New Jersey 1948
L Bleitz, Donald L., Box 269, Los Angeles 28, California 1947
Bliese, John C[arl] W[illiam], Biology Dept., Nebraska State Teachers College, Kearney, Nebraska 1951
Blomquist, Eric G., 2926 N. 76th Ave., Chicago 35, Illinois 1954
L Bloomer, Wilson C., 107 Myrtle Ave., Newark, New York 1955
Blouch, Ralph I[rving], Houghton Lake Wildlife Experiment Station, Box 78, Houghton Lake Heights, Michigan 1949
Blount, Miss Elisabeth Rose, 741 Ruiz St., San Antonio 7, Texas 1956
Boag, David A., c/o "Kilmagar," Volmer P. O., Alberta, Canada ... 1955
L Bock, Walter, Biological Laboratories, Harvard University, Cambridge 38, Massachusetts 1952
Bodsworth, Fred, 294 Beech Ave., Toronto 8, Ontario, Canada 1954
F Bond, James, Academy of Natural Sciences, 19th and Race Sts., Philadelphia, Pennsylvania ..... (1923) 1946
EM Bond, Richard M[arshall], Kings Hill, St. Croix, U. S. Virgin Islands (1939) 1945
L Bond, Richard R[andolph], Department of Biology, Salem College, Salem, West Virginia 1952
Bone, Frederic W[atters], 683 Yale Ave., Riverview Heights, Albert Co., New Brunswick, Canada 1956
Booth, Dr. Ernest S[heldon], Department of Biology, Walla Walla College, College Place, Washington 1946
Booth, Mrs. Robert V. D., 1085 Bank St., Painesville, Ohio 1951
Bordner, Miss Dorothy Louise, 926 W. Beaver Ave., State College, Pennsylvania 1953
Borell, A[drey] E[dwin], Biologist, Great Plains States, Soil Conservation Service, 321 New Custom House, Denver 2, Colorado .. 1927
Borror, Arthur Charles, 1593 Minnesota Ave., Columbus 11, Ohio .. 1957
Borror, Dr. Donald J[oyce], Department of Zoology and Entomology, Ohio State University, Columbus 10, Ohio 1936
Botsford, Miss E. Frances, Connecticut College, New London, Connecticut 1947
LEM Boulton, [Wolfrid] Rudyerd, Jr., 3234 Reservoir Rd., N.W., Washington 7, D. C. ..... (1915) 1929
Bourns, T. K. R., Department of Biology, Queen's University, Kingston, Ontario 1953
Bouslog, Dr. John S[amuel], 304 Republic Bldg., Denver 2, Colorado 1930
L Bovey, Martin K., Chelmsford, Massachusetts 1942
HLEM Bowdish, B[eecher] S[coville], Demarest, New Jersey ..... (1891) 1934
HL Bowdish, Mrs. B[eecher] S., [Christabel Everett], Demarest, New Jersey 1902
Bowen, Richard, 703 Pearse Rd., Swansea, Massachusetts 1947
Bowers, Darl Eugene, Mills College, Oakland 13, California 1953
Bowers, Glenn L[ee], 28 Stewart Place, Box 222, Shippensburg, Pennsylvania 1951
L Bowers, Jim M., 595 N. 15th St., Salem, Oregon 1953
Bowes, Mrs. Anne La Bastille, Covewood Lodge, Big Moose, New York 1955

Bowles, John, 1424 Kentucky St., Lawrence, Kansas 1957
Bowman, Robert I., 1069 Sterling Ave., Berkeley 8, California 1954
Boyd, Dr. Elizabeth M[argaret], Zoology Department, Mount Holyoke College, South Hadley, Massachusetts 1948
Boyd, John C., 6701 River Road, Bethesda 14, Maryland 1954
Boyer, G[eorge] F[rederick], New College, Taylor's Lane, Boshan, Sussex, England 1946
EM Brackbill, Hervey [Groff], 2620 Poplar Drive, Baltimore 7, Maryland ..... (1940) 1949
Bradburn, Dr. Donald Muir, 461 Pine St., New Orleans, Louisiana .. 1949
Braden, Prof. Waldo W., 535 Ursuline Drive, Baton Rouge, Louisiana 1957
Bradley, Miss Anna Penfield, 352 Whitney Ave., New Haven, Connecticut 1933
Bradley, Leonard J[oseph], Horseshoe Rd., Wilton, Connecticut ... 1946
Bradley, Van A., 6836 Cherry Lane, Lincolnwood 45, Illinois 1957
Brainerd, John W., Springfield College, Springfield, Massachusetts .. 1938
Braman, Mrs. Myrtle, 206 W. Stayton Ave., Victoria, Texas 1951
Branch, Mrs. Margaret G[amble], 1324 Wells St., Ann Arbor, Michigan 1954
L Brand, Mrs. Albert R[ich], 700 Stewart Ave., Ithaca, New York 1934
Brandt, John H., General Delivery, Durango, Colorado 1957
Brattstrom, Bayard H., Adelphi College, Garden City, New York ... 1957
Braunberns, James E[dward], Eighteen Mile Creek Rd., Derby, New York 1949
Brauner, Joseph, 1033 Elkgrove Ave., Apt. 1, Venice, California 1933
L Brecher, Leonard C[harles], 1900 Spring Dr., Louisville 5, Kentucky 1946
F Breckenridge, Dr. Walter John, Museum of Natural History, University of Minnesota, Minneapolis, Minnesota ..... (1926) 1950
Breiding, George [Herbert], Oglebay Park, Wheeling, West Virginia 1944
Breitenbach, Robert Peter, University of Wisconsin, 3203 N. Downer Ave., Milwaukee 11, Wisconsin 1957
Brettle, Arthur C., 159 Pleasant Ave., Hamburg, New York 1954
Brewer, Harvey W., 270 Herbert Ave., Closter, New Jersey 1954
Brewer, Richard, Vivarium Building, Champaign, Illinois 1956
Brigham, Edward Morris, Jr., Kingman Museum of Natural History, Battle Creek, Michigan 1942
Brigham, H[erbert] Storrs, Jr., 5990 S. W. 44th Terrace, Miami 43, Florida 1946
Brinckerhoff, Remsen, 156 Sherwood Pl., Englewood, New Jersey .. 1947
Bristow, Miss Alice A[ndrews], Silvermine Rd., New Canaan, Connecticut 1949
Bristow, Harry S[herman], Jr., 210 Washington Ave., Cedars, Wilmington, Delaware 1940
Brittan, Martin Ralph, Department of Life Sciences, Sacramento State College, Sacramento, California 1947
Brock, Jean A. M., 9752 Old Warson Rd., St. Louis 17, Missouri 1946
Brocke, Rainer H[ans], 5707 Woodward, Apt. 7, Wayne, Michigan 1952
Brockner, Winston William, 63 Ardmore Place, Buffalo 13, New York 1952
EM Brodkorb, Dr. [William] Pierce, Department of Biology, University of Florida, Gainesville, Florida ..... (1925) 1937

Brodrick, Harold J[ames], Big Bend National Park, Texas 1935
Brody, Dr. Gerald L[ee], Department of Pathology, University Hospital, Ann Arbor, Michigan 1951
EM Broley, Charles Lavelle, Delta, Ontario, Canada ..... (1926) 1949
Brookfield, Charles M[ann], Box 284, Coconut Grove, Miami 33, Florida 1951
F Brooks, Maurice Graham, Division of Forestry, West Virginia University, Morgantown, West Virginia ..... (1930) 1950
EM Brooks, Winthrop Sprague, Kings Highway, Orleans, Massachusetts (1907) 1917
Brooman, Edwin William, 590 River St., East, Prince Albert, Saskatchewan, Canada 1945
Brooman, R[onald] C[harles], c/o Bank of Montreal, Kitchener, Ontario, Canada 1951
EM Broun, Maurice, Hawk Mountain Sanctuary, R. D. 2, Kempton, Pennsylvania ..... (1922) 1948
Brower, Dr. Auburn E[dmond], 8 Hospital St., Augusta, Maine 1951
Brown, Jerram L[efevre], Museum of Vertebrate Zoology, Berkeley 4, California 1949
Brown, J[ohn] Warner, Oatka Farm, Scottsville, New York 1951
Brown, Mortimer F[ayette], Overlook Rd., Westport, Connecticut .. 1951
Brown, N[orman] Rae, Faculty of Forestry, University of New Brunswick, Fredericton, New Brunswick, Canada 1946
Brown, Wendell, 5224 Blake Rd., Minneapolis, Minnesota 1949
Brown, William James, 4129 Dorchester St., West, Westmount, Quebec, Canada 1908
Brown, W. L., 173 Hillhurst Blvd., Toronto, Ontario, Canada 1953
Brown, Woodward H[art], 4815 Ingersoll Ave., Des Moines 12, Iowa 1950
Browne, Andrew C., 350 Delmas Ave., San Jose 26, California 1952
Bruce, James A[ddison], 565 E. Spring St., Wooster, Ohio 1952
Bruestle, Bertram G[eorge], Old Lyme, Connecticut 1929
Brumbaugh, Chalmers Sherfey, 317 St. Dunstan's Rd., Homeland, Baltimore 12, Maryland 1916
Bruns, James Henry, 1820 Jefferson Ave., New Orleans, Louisiana .. 1942
L Bruton, Ja[me]s D[eWitt], Jr., P. O. Box 33, Plant City, Florida .. 1949
EM Bryant, Dr. Harold Child, 245 Glorietta Blvd., Orinda, California (1913) 1918
Bryens, Oscar McKinley, 231 South Main St., Three Rivers, St. Joseph Co., Michigan 1924
Buchheister, Carl W[illiam], 1239 Madison Ave., New York 28, New York 1939
Buckalew, John H[erbert], 70½ Lake Ave., Wolcott, New York ... 1948
Buckland, George [Henry Edward], R. R. 1, Box 343 Batavia, New York 1948
Buckley, P[aul] A[nthony], 6024 Fieldston Road, Riverdale 71, New York City, New York 1957
L Bucknell, Donald [Needham], 134 Wonham St., Ingersoll, Ontario, Canada 1949
L Bull, Dan Bernard, Box 608, La Mesa, California 1957
Bull, John L., Jr., 1148 Virginia St., Far Rockaway 91, New York ... 1947

Bullock, Dillman Samuel, Casilla 2D, Angol, Chile 1920
Bunnell, John R., 1920 Baltimore Ave., Cincinnati 25, Ohio 1955
Burch, Rose Lenora [Mrs. John Q.], 4206 Halldale Ave., Los Angeles 62, California 1947
Burdick, David L[ivingston], R. R. 3, Box 66L, Rockford, Illinois .. 1957
Bures, Joseph A., 148 N. 3rd St., West Newton, Pennsylvania 1944
Burgess, Lawrence C. N., 9111 - 149 St., Edmonton, Alberta, Canada 1956
Burk, Dr. Myrle M., R. R. 2, Waterloo, Iowa 1953
Burkhart, Mrs. Elizabeth Z[immerman], Box 28, Route 1, Emmaus, Pennsylvania 1949
F Burleigh, Thomas Dearborn, School of Forestry, University of Idaho, Moscow, Idaho ..... (1913) 1948
Burmeister, Melvin W[illiam], 9822 Montrose Ave., Schiller Park, Illinois 1948
Burner, Charles C[raig], 1410 S. Olive, Pittsburg, Kansas 1946
Burner, Miss Florence H., 5350 Reisterstown Rd., Baltimore 15, Maryland 1953
Burnett, Miss Frances L., Proctor St., Manchester, Massachusetts ... 1946
Burns, Robert D[avid], Department of Zoology, M.S.U., East Lansing, Michigan 1952
Burns, Robert K[yle], Carnegie Laboratory of Embryology, Wolfe and Madison Sts., Baltimore 5, Maryland 1947
Burr, Dr. Irving W[ingate], 1141 Glenway, W. La Fayette, Indiana 1939
Burrows, George [Howard] [II], R.F.D. 1, New Market, New Hampshire 1951
Bursewicz, John, 14 Chapin St., Jamestown, New York 1957
Burton, Donald E., 171 Strathearn Rd., Toronto 10, Ontario, Canada 1955
Burton, E[dward] Milby, The Charleston Museum, Charleston, South Carolina 1929
Burtt, Dr. Benjamin P[ickering], 109 Haffenden Rd., Syracuse 10, New York 1956
Burtt, Harold E., Department of Psychology, Ohio State University, Columbus 10, Ohio 1952
Bushar, Don Mylo, 2806 Military Rd., Sioux City 17, Iowa 1954
Bushman, John B[ranson], Ecological Research, University of Utah, Dugway, Utah 1948
EM Buss, Prof. Irven O[tto], 804 Alpha Rd., Pullman, Washington (1939) 1954
Butler, Mrs. Christella Campbell, 1422 Parkland Ave., Parkland, Bucks Co., Pennsylvania 1946
Buxton, Robert B[urns], Box 427, Damariscotta, Maine 1949
Byrd, Mitchell A[gee], Department of Biology, College of William and Mary, Williamsburg, Virginia 1950
Cadbury, Joseph M[oore], 108 W. Phil-ellena St., Philadelphia 19, Pennsylvania 1940
EM Cade, Tom[my] [Joe], 526 Gayley, Los Angeles 24, California 1957
Cadwalader, Capt. John, USNR, Ambler, Pennsylvania 1940
Cady, Dr. Walter G[uyton], 3350 Calvert Rd., Pasadena 8, California 1950
EM Cahalane, Victor H[arrison], New York State Museum, Albany 1, New York ..... (1934) 1946
Calder, David R., 35 Meyrick Ave., Durban, Natal, Union of South Africa 1955

Caldwell, Dorothy W., 73 Foster St., Littleton, Massachusetts 1939
Caldwell, Larry D., Department of Zoology, University of Georgia, Athens, Georgia 1954
Calef, Robert Taylor, 734 East University, Ann Arbor, Michigan ... 1954
Callahan, Philip Serna, Entomology Research Department, Louisiana State University, Baton Rouge, Louisiana 1953
Calvert, Earl Wellington, R. R. 2, County Home, Lindsay, Ontario, Canada 1936
Calvin, Robert L[eal], 35 Fairhill Dr., Mt. D. 11, New Castle, Pennsylvania 1950
Calvo, Manuel J., 4101 Dresden St., Kensington, Maryland 1948
Campbell, Mrs. Elizabeth W. Crozer, Route 2, Box 871-A, Tucson, Arizona 1947
Campbell, John M., 232 Whitney Ave., New Haven, Connecticut .. 1951
EM Campbell, Louis W[alter], 4531 Walker Ave., Toledo 12, Ohio (1929) 1939
Campbell, Mildred F[lorence], 29 North Hawthorne Lane, Indianapolis 19, Indiana 1954
Camras, Dr. Sidney, 6115 North Springfield, Chicago 45, Illinois .. 1937
Cant, Gilbert, 716 Guion Dr., Mamaroneck, New York 1946
Cantor, Irving, 75 Bank St., New York 14, New York 1952
Cardiff, Eugene A[lvin], 2736 Court Street, Rialto, California 1949
Carl, George Clifford, Provincial Museum, Victoria, British Columbia, Canada 1941
Carl, Harry G., 2304 Davie St., Davenport, Iowa 1949
Carleton, Geoffrey, 40 W. 12th St., New York 11, New York 1957
LEM Carnes, Mrs. Herbert E., 31 Dogwood Lane, Tenafly, New Jersey (1944) 1955
Carpenter, Dr. Charles C., Department of Zoology, University of Oklahoma, Norman, Oklahoma 1952
EM Carriker, M[elbourne] A[rmstrong], Jr., Apartado Nac. No. 82, Popayán, Colombia, South America ..... (1907) 1933
Carson, L[enwood] B[allard], 1306 Lincoln, Topeka, Kansas 1948
Carter, Charles E[dward], 1339 30th Street, Orlando, Florida 1951
Carter, Dennis L[ee], Department of Zoology & Entomology, Science Hall, Iowa State College, Ames, Iowa 1954
Carter, Dilford Campbell, Department of Wildlife Management, Texas A. and M. College, College Station, Texas 1957
Carter, Dr. Frances, Women's Faculty Club, University of California, Berkeley 4, California 1954
Carter, Helen Virginia, 1837 Broadway, New Orleans, Louisiana 1957
Carter, T[homas] Donald, American Museum of Natural History, Central Park West at 79th, New York, New York 1921
EM Cartwright, B[ertram] W[illiam], Ducks Unlimited, 201 Canada Bank of Commerce, Winnipeg, Manitoba, Canada ..... (1924) 1952
Cartwright, John, Cartwright's Point, P. O. Box 358, Kingston, Ontario, Canada 1956
Cartwright, William J[ames], Williamstown, Massachusetts 1920
Case, Ralph E., Bluff Head Farm, Guilford Road, Rt. 77, Durham, Connecticut 1949
Cassel, Dr. J[oseph] Frank[lin], Zoology Department, North Dakota Agricultural College, Fargo, North Dakota 1935

Castle, Dr. Gerald H[arvey], 722–4 Oak Street, Cincinnati 6, Ohio .. 1950
Castle, Peter Watson, 42 Walker St., Cambridge 38, Massachusetts 1953
Caswell, Edwin B., 5638½ N. Sultana Ave., Temple City, California 1952
Caswell, Herbert H[all], Jr., Eastern Michigan College, Ypsilanti, Michigan 1952
Cayouette, Raymond, Quebec Zoological Garden, Charlesbourg, R. R. 2, Quebec, Canada 1936
Chadwick, Betty Ives [Mrs. Arthur], Hidden Meadow Road, Weston, R. D. 4, Connecticut 1957
I. Chalif, Edward Louis, Barnsdale Rd., Short Hills, New Jersey 1935
Chamberlain, Norman A[llison], "Critter Hill," Route 1, Matthews, North Carolina 1950
I. Chamberlain, Samuel Renick, Refugio, Texas 1952
LF Chambers, W[illie] Lee, Robinson Rd., Topanga, California .. (1907) 1953
Chapelle, Lt. Col. Francis O., MSC, U. S. Army Hospital, West Point, New York 1954
F Chapin, Dr. James P[aul], c/o IRSAC, Bukavu (depêche speciale), Kivu, Belgian Congo..... (1906) 1921
Chapin, Dr. John L[adner], Physiology Department, University of Colorado Medical School, Denver, Colorado 1950
Chapin, Ruth Trimble, [Mrs. James Paul] c/o IRSAC, Bukavu (depêche speciale) Kivu, Belgian Congo 1932
Chapman, Dr. Floyd Barton, 392 Walhalla Rd., Columbus 2, Ohio.... 1936
Chapman, Lawrence B[oylston], Princeton, Massachusetts 1930
Chase, Henry B[right], Jr., 517 Decatur St., New Orleans 16, Louisiana 1948
Cheek, John A[damsen], Jr., 226 North Fourth St., Danville, Kentucky 1952
Cheshire, W[illiam] F[rancis], 667 Elizabeth St., Fredericton, N. B., Canada 1950
Chew, Dr. Robert M., Department of Zoology, University of Southern California, Los Angeles 7, California 1953
Choate, Dr. Ernest A., 411 Rodman Ave., Jenkintown, Pennsylvania 1943
Church, Ronald L., 478 Capital St., Oakland 10, California 1953
Churchill, Mrs. L. W., 10 Juniper Rd., Belmont 78, Massachusetts 1951
Chute, Richard S[ears], 78 Upland Rd., Brookline 46, Massachusetts 1950
Clancey, Phillip Alexander, Durban Museum and Art Gallery, Durban, Natal, South Africa 1951
Clapp, Richard L[owell], 1720 Brooklyn, Box 10, Los Angeles 33, California 1952
Clapp, Roger Barnum, RFD 1, Falls Village, Connecticut 1957
Clark, Mrs. Ben P., 948 Forrest Ave., Gadsden, Alabama 1955
Clark, Fanny Dwight, [Mrs. Grenville?, Dublin, New Hampshire 1940
Clark, George A[lfred], Jr., 1 West Campus, Easton, Pennsylvania 1956
Clark, George R[oberts], W. Valley Green Rd., Flourtown, Pennsylvania 1926
Clark, Gregory, 119 Crescent Rd., Toronto, Ontario, Canada 1951
Clarke, Charles Everett, 76 Ashland St., Medford 55, Massachusetts .. 1907
EM Clarke, Dr. C[harles] H[enry] D[ouglas], Fish and Wildlife Division, Department of Lands and Forests, Parliament Buildings, Toronto 2, Ontario, Canada ..... (1931) 1947
Clarke, Dr. George L[eonard], Biological Laboratories, Harvard University, Cambridge 38, Massachusetts 1956

L Clarke, William S., Jr., Box 167, State College, Pennsylvania 1947
L Clarkson, Elizabeth Barnhill, [Mrs. Edwin O.], Wing Haven, 248 Ridgewood Ave., Charlotte, North Carolina 1943
Clattenburg, Albert E[dwin], Jr., 4764 33rd St. N., Arlington 7, Virginia 1929
Clay, C. I., Box 353, Eureka, California 1950
L Cleaves, Howard H[enderson], 8 Maretzek Court, Staten Island 9, New York 1907
Cleghorn, James Donald, Zoology Division, Redpath Museum, McGill University, Montreal 2, Quebec, Canada 1937
Clement, Roland C[harles], 26 Brookfield Rd., Riverside 15, Rhode Island 1935
L Clements, H[iram] Everest, 49 Stoneham Rd., Rochester 10, New York 1949
Clough, Garrett C[onde], Department of Zoology, University of Wisconsin, Madison 6, Wisconsin 1948
Clow, Miss Marion [Frances], P. O. Box 163, Lake Forest, Illinois .. 1929
Clyde, E. C., Jr., Effingham, South Carolina 1956
Cobb, Boughton, 180 Madison Ave., New York, New York 1948
Cobb, Dr. Stanley, 34 Fernald Drive, Cambridge 38, Massachusetts 1909
Coble, Miss Mary Ferguson, 1357 N. Stanley, Hollywood 46, California 1953
EM Coffey, Ben Barry, Jr., 672 N. Belvedere, Memphis, Tennessee .. (1929) 1950
Coffin, Mrs. Francis Hopkinson, 1512 Jefferson Ave., Scranton, Pennsylvania 1921
Coggeshall, Robert D[wight], Billington Rd., East Aurora, New York 1954
Coggins, Herbert L[eonard], 2764 Filbert St., San Francisco, California 1898
EM Cogswell, Howard L[yman], Department of Biological Sciences, Mills College, Oakland 13, California ..... (1943) 1952
Cohn, Dr. Zanvil A., 1948 Rosemary Hills Drive, Apt. #3, Silver Spring, Maryland 1955
Cole, [Margaret] Evelyn, 707 East Chester St., Jackson, Tennessee .. 1950
L Cole, Richard D[aniel], 625 Valley Lane, Towson 4, Maryland 1951
Cole, Mrs. Whiteford R., Jr., 1746 Sulgrave Rd., Louisville 5, Kentucky 1955
Cole, William W[alter], Jr., R. D. 3, Box 316, Apollo, Pennsylvania .. 1956
EM Collias, Dr. Nicholas E[lias], c/o Mrs. Dora D. Cole, 181 Clinton Ave., Tiffin 10, Ohio ..... (1950) 1954
Collier, Gerald 3634, N. Muscatel Ave., Rosemead, California 1953
Collins, Mrs. D[aniel] S., [Kathryn W.], 603 Thomas Ave., Jonesboro, Arkansas 1950
L Collins, Henry Hill, Jr., 1200 Post Road, Scarsdale, New York 1923
Collister, Allegra Edith [Mrs. Carl], 706 Hover Rd., Longmont, Colorado 1949
Collum, Thomas F[rancis], 1070 Lucile Ave. S. W., Atlanta 10, Georgia 1957
Colton, Harold S[ellers], Coyote Range, Box 601, Flagstaff, Arizona 1944
Colwell, Frederick A[ndrew], R. F. D. 2, Collegeville, Pennsylvania .. 1949
Comfort, James F[rank], 27 N. Iola Dr., Webster Groves 19, Missouri 1951
Compton, Miss Dorothy M[ay], 22 Wilton St., Princeton, New Jersey 1931
Compton, Dr. Lawrence V[erlyn], Biology Division, Soil Conservation Service, Washington 25, D. C. 1926

L	Conboy, Mrs. John William, [Esther Cogswell], 417 Studebaker St., Mishawaka, Indiana	1954
	Cone, Edward T[oner], 1 Queenston Place, Princeton, New Jersey	1933
	Congdon, Dr. Russell T[hompson], 122 S. Cleveland, Wenatchee, Washington	1947
	Conkey, John Houghton, 11 Chestnut St., Ware, Massachusetts	1929
	Conn, Robert C., 755 Ross Lane, Bound Brook, New Jersey	1945
	Connor, Paul F., New York State Museum, Albany 1, New York	1957
	Conway, William G[aylord], New York Zoological Society, Bronx Park, New York 60, New York	1951
L	Cooch, F[rederick] Graham, 685 Echo Dr., Ottawa, Ontario, Canada	1952
	Cook, Fannye A[ddine], Apt. 4B, 827 North State St., Jackson, Mississippi	1924
	Cook, Robert E[dwin], Main St., Elverson, Pennsylvania	1950
	Cook, [William] Bolton, 20 Irenhyl Ave., Port Chester, New York	1929
LEM	Cooke, Miss May Thacher, Apt. 401, 1400 Fairmount St., N. W., Washington, D. C. (1915)	1926
	Coolidge, Oliver H[ill], Broad Brook Road, Bedford Hills, New York	1928
	Coolidge, Philip T[ripp], Box 102, Bangor, Maine	1919
L	Coombes, Robert A[rmitage] H[amilton], British Museum (Natural History), The Zoological Museum, Tring, Hertfordshire, England	1935
	Coombs, Mrs. Robert D., 375 Paramus Rd., Paramus, New Jersey	1957
HL	Cope, Francis R[eeve], Jr., Dimock Post Office, Pennsylvania	1892
	Cope, James B[onwill], Earlham College, Richmond, Indiana	1948
HL	Copeland, Prof. Manton, 88 Federal St., Brunswick, Maine	1900
	Corbett, Kenneth Blair, R. F. D., Box 68, Lancaster, Pennsylvania	1947
	Corey, Eben F[ox], Barrett's Mill Rd., Concord, Massachusetts	1949
	Cormier, Francis, 27 North Central Ave., Hartsdale, New York	1952
	Corneil, Paul, 1910 Florida, Baytown, Texas	1957
F	Cottam, Dr. Clarence, Welder Wildlife Foundation, P. O. Box 1396, Sinton, Texas (1928)	1942
	Cottrell, G[eorge] W[illiam], Jr., 70 Lakeview Ave., Cambridge 38, Massachusetts	1938
	Cottrille, Mrs. W. Powell, 6075 Brown's Lake, Jackson, Michigan	1953
	Cottrille, Dr. W[illiam] Powell, 6075 Brown's Lake Rd., Jackson, Michigan	1951
	Coursen, C[harles] Blair, 8200 S. Hayne Ave., Chicago 20, Illinois	1928
	Coven, Glenn E., Millstone Rd., R. F. D. 1, Somerville, New Jersey	1953
	Covert, James L[ee], 256 Ridgeway Corner, Louisville 7, Kentucky	1949
	Cowan, John B[etts], Gray Lodge Refuge, Gridley, California	1951
	Cox, George Wyatt, Vivarium Bldg., Wright and Healey St., Champaign, Illinois	1957
	Cox, Sam M[adison], 2624 Minnesota Ave., Duluth 11, Minnesota	1947
	Coxon, Thomas T., 2502 Leon Ave., Vero Beach, Florida	1954
	Coy, Roy E[arl], St. Joseph Museum, 11th and Charles, St. Joseph 13, Missouri	1951
	Cragg, Hoyt J., 4451 Tupelo St., Baton Rouge, Louisiana	1947
F	Crandall, Lee Saunders, New York Zoological Park, 185th St. and Southern Blvd., New York, New York (1909)	1951
L	Crane, Cornelius, c/o Eva B. Simpson, Secretary, 389 West 225th St. New York 71, New York	1930

Crawford, Alan, Jr., White Horse Rd., Devon, Pennsylvania 1949
Crawford, Mary Newell, White Horse Rd., Devon, Pennsylvania ... 1946
Creager, Joe C[lyde], Drawer 1267-L.A. Cann Dr., Ponca City, Oklahoma 1948
Cringan, A. T., 22 Collingwood, Guelph, Ontario, Canada 1948
L Crockett, David, 3933 Kirkland Court, Route 3, Bloomfield Hills, Michigan 1955
Croft, Joseph E[dward], 2366 Gladstone Ave., Louisville 5, Kentucky 1957
Crompton, Davis H[astings], 74 William St., Worcester, Massachusetts 1934
Crouch, Dr. James E[nsign], San Diego State College, San Diego 5, California 1928
Crowell, Mrs. Prince S[ears], Box 746, Woods Hole, Massachusetts .. 1930
Crowell, Prince S[ears], Jr., Department of Zoology, Indiana University, Bloomington, Indiana 1946
Crowley, Lawrence D., 1212 Cascade, Boulder, Colorado 1955
L Crowninshield, Mrs. Francis, Peach Point, Marblehead, Massachusetts 1941
EM Cruickshank, Allan D[udley], R. R. 1, Box 1590, Rockledge, Florida (1933) 1945
Crumpacker, Mrs. D. P., R. R. 3, Milan, Missouri 1952
Cruttenden, Mrs. John R., 2020 Maine St., Quincy, Illinois 1957
Cumming, Fairman P., Box 330, Nashville 1, Tennessee 1952
Cummings, G[eorge] Clark, Room 1018, 61 Broadway, New York 6, New York 1951
Cunningham, James W., 3009 E. 19th St. Terrace, Kansas City, Missouri 1937
Cunningham, Richard L[ynn], 2176 N. W. 24th St., Miami, Florida .. 1952
Curl, Dr. A[lfred] Laurence, 751 Balra Dr., El Cerrito 8, California .. 1950
Curry, Haskell B[rooks], Pennsylvania State University, University Park, Pennsylvania 1943
Curtin, David Y., 3 W. Montclair, Urbana, Illinois 1953
Curtis, Miss Elizabeth L[ong], 5648 Beach Dr., Seattle 16, Washington 1934
Curtis, Mrs. Vee [Kaelin], 2412 Cohasset Rd., Chico, California 1947
Cuthbert, Dr. Nicholas L[e Huray], Central Michigan College, Mount Pleasant, Michigan 1951
Cutler, Henry H., 5 Shelley Rd., Wellesley Hills 82, Massachusetts 1954
Dahmer, Horace A., 174 Simeon St., Kitchener, Ontario, Canada 1954
Dallas, Donald E[dward], Jr., LtJG, BTG-3N NAAS Whiting Field, Milton, Florida 1953
Daly, Edwin J., 16 Prospect Pl., Brooklyn 17, New York 1957
Dana, Edward F[ox], 57 Exchange St., Portland, Maine 1941
Dane, Benjamin, Stimson Hall, Cornell University, Ithaca, New York 1957
D'Angelo, Angelo, 32 Hamilton Ave., Hasbrouck Heights, New York 1946
Darby, Richard T[horn], Prospect St., Sherborn, Massachusetts 1936
Darby, R[ollo] E[verett], 2103 Walnut, Carmichael, California 1950
Darden, Mrs. Colgate W., Carr's Hill, Charlottesville, Virginia 1954
Darling, Louis, Center St., Westport, Connecticut 1954
Darrah, Miss M[ary] Elizabeth, 317 East Buffalo St., Ithaca, New York 1955
Dater, Mrs. John Y. [Eleanor E.], 259 Grove St., Ramsey, New Jersey 1949
Davenport, Mrs. Allen G[raham], [Mabelle Griffith], 39 Walcott Ave., Jamestown, Rhode Island 1951

Davey, Dr. Winthrop N., University Hospital, Ann Arbor, Michigan 1946
Davidson, John B., 327 Driftwood Rd., Corona Del Mar, California .. 1954
Davidson, Mrs. William F., 332 Summit Ave., St. Paul 2, Minnesota .. 1955
Davidson, William M[ark], 1504 Bodell St., Orlando, Florida 1927
Davis, Bertha Eunice, Box 18, Hampden, Massachusetts 1920
Davis, Clifford V[ernon], Department of Zoology and Entomology, Montana State College, Bozeman, Montana 1948
EM Davis, Dr. David E[dward], School of Hygiene and Public Health, Johns Hopkins University, Baltimore 5, Maryland ..... (1935) 1941
Davis, Dr. Earle A., Jr., College of Osteopathic Physicians and Surgeons, 1721 Griffin Ave., Los Angeles 31, California 1946
Davis, Dr. Edwin G[riffith], 1316 22nd St., South, Arlington 2, Virginia 1940
Davis, Frederick Whitlock, 12004 Colesville Rd., Silver Spring, Maryland 1955
Davis, Gertrude L. [Mrs. James M.], 203 Collingsworth Drive, Rochester 10, New York 1949
EM Davis, Dr. John, Hastings Reservation, Jamesburg Route, Carmel Valley, California ..... (1939) 1953
EM Davis, L[ouie] Irby, Box 988, Harlingen, Texas ..... (1935) 1955
Davis, Malcolm, R. F. D. 2, Herndon, Virginia 1938
Davis, Lt. Paul A[nthony], 829 Grant St., Gary, Indiana 1953
Davis, Peter Wright, 506 North Center Ave., Merrill, Wisconsin 1956
LEM Davis, Dr. William B., Department of Wildlife Management, A. and M. College of Texas, College Station, Texas ..... (1938) 1949
Davis, Dr. William E[dwin], Old Acres, R. F. D., Bedford, Massachusetts 1949
Davis, Dr. William F[ranklin], 1800 E. 105th St., Cleveland 6, Ohio .. 1947
Dawe, Arnold L[ewis], R. R. 2, Weston, Ontario, Canada 1948
Dawn, Walter H[enry], 176 Wentworth St., Apt. E, Charleston, South Carolina 1947
Dawson, Elliot W., University of Cambridge, Department of Zoology, Downing St., Cambridge, England 1957
EM Dawson, Dr. William Ryan, Department of Zoology, University of Michigan, Ann Arbor, Michigan ..... (1947) 1955
Dean, Mrs. Blanche E., Apt. 13, 1228 South 29th St., Birmingham 5, Alabama 1949
Dean, William B., 282 Lake St., Seekonk, Massachusetts 1946
L Deane, Mrs. Ruthven, 830 Hibbard Rd., Winnetka, Illinois 1935
Dear, L[ionel] S[extus], P. O. Box 146, Port Arthur, Ontario, Canada 1928
Dearborn, John H., Meadow Cove Rd., East Boothbay, Maine 1952
De Camps, Ernest Jules, R. F. D. 5, Greer, South Carolina 1946
Dechen, Mrs. Lillian O[rvetta], 14 Summer St., Port Dickinson, Binghamton 6, New York 1949
Decker, Anton M[ichael], 75 North St., Ext., Rutland, Vermont 1949
DeCou, Richard W[illiam], Crosswicks, New Jersey 1949
DeGroot, Dr. Dudley S[argent], Athletic Branch-S.A.D., U.S.A.R.E.-U.R., APO 245, c/o P. M. New York City, New York 1947
F Deignan, Dr. Herbert G[irton], Division of Birds, U. S. National Museum, Washington 25, D. C. ..... (1923) 1946
Dejulis, Anne Victoria, 61 Berkeley Ave., Belleville 9, New Jersey 1951

F	Delacour, Jean, Los Angeles County Museum, Exposition Park, Los Angeles 7, California ..... (1926)	1946
	De La Vega, Mario, Jr., c/o Sucs. de Alonso y Cia., S. A. Apartado No. 337, Havana, Cuba	1949
	Demme, Robert Jonathan, 27 Lorenz Ave., Baldwin, New York	1957
	Denham, Reginald, 100 Central Park South, New York, New York	1947
	Denney, Dr. John DeWitt, 30 S. 2nd St., Columbia, Pennsylvania	1951
	Dennis, John V[alue], 17 Liberty St., Nantucket, Massachusetts	1948
EM	Denton, Dr. J[ames] Fred, 1510 Pendleton Rd., Augusta, Georgia (1935)	1950
HL	Derby, Dr. Richard, Oyster Bay, Long Island, New York	1898
LF	De Schauensee, Rodolphe M[eyer], Devon, Pennsylvania ..... (1925)	1942
L	Desmond, Thomas C[harles], Box 670, Newburgh, New York	1929
	Dettmann, Warren, Milwaukee Public Museum, Milwaukee, Wisconsin	1936
	Detwiler, Rev. Garrett S., 194 Seventh St., Salem, New Jersey	1957
	DeVane, Claude L[ee], Parks and Playgrounds Department, Courthouse, Tampa, Florida	1954
	Devaney, Bernard [Charles], 212 Nevin St., Lancaster, Pennsylvania	1948
	De Vel, Dr. Leon, 739 Plymouth Blvd. SE, Grand Rapids 6, Michigan	1948
	Devitt, Otto Edmund, Richmond Hill, Box 916, Ontario, Canada	1933
	Devlin, Joseph M[ark], 218 South 43rd St., Philadelphia 4, Pennsylvania	1955
	De Vos, Dr. Antoon, Department of Entomology and Zoology, Ontario Agriculture College, Guelph, Ontario, Canada	1954
	Dexter, Dr. Ralph W[arren], Kent State University, Kent, Ohio	1942
	Dick, John Henry, Dixie Plantation, Meggett, South Carolina	1956
	Dickens, Miss Elizabeth, Dickens Point, Block Island, Rhode Island	1921
	Dickerson, Mrs. Stanley S., 222 Devoe Ave., Spotswood, New Jersey	1957
	Dickerson, Stanley S., 77 Main St., South River, New Jersey	1954
L	Dickey, Mrs. Florence V. V., Kenton Cottage, Alleghany, Sierra County, California	1948
	Dickie, Mrs. Roy N. [Eva S.], 3840 Loquat Ave., Miami 33, Florida ..	1952
EM	Dickinson, Dr. J[oshua] C[lifton], Jr., Department of Biology, University of Florida, Gainesville, Florida ..... (1937)	1952
	Dickinson, Harold, Department of Engineering, University College of Swansea, Singleton Park, Swansea, Wales	1957
	Diedrich, John Lester, 3125 West Pierce St., Milwaukee 15, Wisconsin	1948
	Dignam, John Hugh, 51 Bishop Ave., Willowdale, Ontario, Canada ..	1953
	Dignan, Adrian John, 98 Hillside Ave., Freeport, L. I., New York	1956
EM	Dilger, Dr. William C., Laboratory of Ornithology, Cornell University, Ithaca, New York ..... (1951)	1957
	Dillery, Dean G., 1118 20th Ave., Columbus, Ohio	1957
	Dingle, Edward von Siebold, Huger, South Carolina	1920
	Dingle, Hugh, 156 Spruce St., Princeton, New Jersey	1953
	Dittemore, Lester Poe, 1207 Bryon Ave., Topeka, Kansas	1952
	Diven, Liscum, Box 1063, Route 1, Scottsdale, Arizona	1956
	Dixon, James B[enjamin], 2266 Cranston Dr., Escondido, California	1939
EM	Dixon, Dr. Keith L[ee], Department of Wildlife Management, A. and M. College of Texas, College Station, Texas ..... (1943)	1953
	Dixon, Ralph E., P. O. Box 981, Del Mar, California	1947
	Dobie, Mrs. James Frank, 702 Park Place, Austin 5, Texas	1956

Dodge, Ernest S[tanley], Peabody Museum, Salem, Massachusetts 1936
Doepel, Mrs. Henry W., [Leslie O.], 30 Cooper Lane, Larchmont, New York 1952
Doering, Hubert R[aymond], 242 East Walton Place, Chicago 11, Illinois 1944
Donnelly, Miss Grace Marie, 102 Helen M. White House, Ithaca, New York 1954
Dornan, John, E. Graver's Lane and Flourtown Rd., Chestnut Hill, Philadelphia 18, Pennsylvania 1947
Dorsey, George A., Darlington School, Rome, Georgia 1954
Douglass, Dr. Donald W[ickware], Game Division, Department of Conservation, Mason Building, Lansing 26, Michigan 1943
Dowling, P[aul] Bruce, A. A. Busch Wildlife Area, Weldon Springs, Missouri 1950
Down, E. H., 28 Lynton Mead, Totteridge, London, N. 20, England .. 1952
Downing, Kirk Edward, Box 489, Arkansas City, Kansas 1957
Downing, Paul E., 459 Roger Williams Ave., Highland Park, Illinois 1954
Downs, Mrs. James R., South Londonderry, Vermont 1954
Drake, Robert J., Department of Zoology, University of Arizona, Tucson, Arizona 1957
Drayton, John W[elsh], Waterloo and Sugartown Rds., Berwyn, Pennsylvania 1957
Dressel, Evan C[harles], Western Reserve Rd., R. R. 1, Poland, Ohio 1949
Dresser, Mrs. James D., Jr., 9620 Von Thaden, Wichita, Kansas 1950
Drinkwater, Howard [Frank], Whitehouse Station, New Jersey 1950
L Drury, Dr. William H., Jr., Drumlin Farm, South Lincoln, Massachusetts 1935
EM Du Bois, Alexander Dawes, Christmas Lake Road, R. R. 5, Excelsior, Minnesota ..... (1905) 1950
Duff, C[arroll] V[ictor], 2911 Antelo View Drive, Los Angeles 24, California 1953
Duffield, Mrs. J. W. [Marjorie O.], 1472 Eskridge Way, Olympia, Washington 1952
Duffy, John J[oseph], Jr., 7219 Richwood, Little Rock, Arkansas 1952
Dumback, Edward A., Route 1, Box 106, Independence, Wisconsin .. 1954
EM Du Mont, Philip A[tkinson], 4114 Fessenden St., N. W., Washington 16, D. C. ..... (1927) 1941
Dunbar, Mrs. Henry F., R. F. D. 3, Box 194, Kingston, New York.... 1955
Duncan, Dr. Stewart, c/o Biology Department, Boston University, 675 Commonwealth Ave., Boston, Massachusetts 1954
Dunham, Mrs. Caroline A[llen], 450 Beverly Road, Ridgewood, New Jersey 1933
Dunham, David Warren, 96 West Main St., Dryden, New York 1956
Dunlap, Dr. V[ining] C[ampbell], Bowdoinham, Maine 1950
L Dunning, John S[tewart], Hungary Road, Gramby, Connecticut 1950
Dunning, Orville M., 22 Longridge Rd., Plandome, New York 1952
Durango, Sigfrid, Taby, Sweden 1956
Durham, Mrs. Alma Gower, 1002 Commercial Ave., Coleman, Texas 1956
L Dvorak, Joseph L[ouis], 6125 Eddy St., Chicago 34, Illinois 1957
Dyer, A. William, 402 John St., Union City, Michigan 1946

Dzubin, Alex, Canadian Wildlife Service, 317 Field Husbandry Bldg., University of Saskatchewan, Saskatoon, Canada 1956
Earle, Osborne, 71 Appleton St., Cambridge 38, Massachusetts 1957
Eastman, Francis B[uck], P. O. Box 96, Mandeville, Louisiana 1909
Eastman, Whitney [Haskins], 4450 West Lake Harriet Blvd., Minneapolis 10, Minnesota 1949
Eaton, Richard J[efferson], Bedford Rd., Lincoln, Massachusetts 1930
Eaton, Dr. Stephen W[oodman], Department of Biological Sciences, St. Bonaventure University, St. Bonaventure, New York 1942
Ebert, Mrs. Ernest C. [Ruth], 3435 Dwight Way #18, Stockton, California 1946
EM Eckelberry, Don [Richard], 4 Foster Lane, Babylon, Long Island, New York ..... (1942) 1957
Edberg, Ragnar, Nygatan 49, Orebro, Sweden 1956
Eddy, Garrett, 4515 Ruffner St., Seattle 99, Washington 1939
Edeburn, Dr. Ralph M[ilton], Marshall College, Huntington 1, West Virginia 1947
Edey, Maitland A[rmstrong], Wolver Hollow Rd., Brookville, Long Island, New York 1948
Edge, Mrs. Charles N[oel], 767 Lexington Ave., New York, New York 1938
Edwards, Alice N[ettleton], [Mrs. O. M.], Box 508, Rockport Cottages, Rockport, Texas 1949
EM Edwards, Dr. Ernest P[reston], Houston Museum of Natural History, Hermann Park, Houston, Texas ..... (1949) 1954
Edwards, Dr. Kenneth F[rederick], 169 Hillendale Ave., Kingston, Ontario, Canada 1952
Egerton, Frank N[icholas] III, 1517 Caswell Place, Durham, North Carolina 1952
L Einhorn, Benjamin, 7 Parker Ave., West Deal, New Jersey 1946
Eiseman, Ralph Milton, 7928 South Colfax, Chicago 17, Illinois 1954
Eisenhart, Jay Newton, R. D. 2, Watervliet, New York 1957
Eisenhart, Ruth C[ecilia], 1316 Riverside Drive - Apt. 51, New York 33, New York 1949
LEM Eisenmann, Eugene, 110 West 86th St., New York 24, New York (1936) 1951
Ekblaw, George E[lbert], 511 W. Main St., Urbana, Illinois 1946
Ekdahl, Conrad H[oward], Box 1246, Daytona Beach, Florida 1948
Eklund, Dr. Carl M[ilton], Rocky Mountain Laboratory, Hamilton, Montana 1950
L Eldredge, Everett, Chatham, Cape Cod, Massachusetts 1928
Eliot, Samuel A[tkins], Jr., 31 Dryads Green, Northampton, Massachusetts 1936
Eliot, Theodore L[yman], 401 Golden Gate Ave., Belvedere, California 1940
Elitharp, Miss Marie, 221 Ten Eyck St., Watertown, New York 1954
Elkins, Kimball C[onro], 3½ Madison St., Cambridge 38, Massachusetts 1940
Ellarson, Robert S[cott], 424 University Farm Place, Madison 6, Wisconsin 1952
Elliott, Charles Fremont, 107 Clinton Place, Hackensack, New Jersey 1936
Elliott, John Jackson, 3994 Park Ave., Seaford, Long Island, New York 1940
Elson, John, 2001 Ogden Ave., Knoxville 16, Tennessee 1957

Ely, Charles [Adelbert], Department of Zoology, University of Oklahoma, Norman, Oklahoma 1948
Ely, Dr. DeForest, 180 Sullican St., New York, New York 1954
Emerson, David Lowell, 155 Burt St., Taunton, Massachusetts 1940
Emerson, Guy, 16 E. 11th St., New York 3, New York 1947
Emerson, Miss Mary Louise, 587 Ashland Ave., Buffalo 22, New York 1949
Emerson, Stephen, 806 W. Main St., Urbana, Illinois 1950
Emerson, William S., c/o Potash & Chemical Co., 201 West Washington Blvd., Whittier, California 1954
Emery, F[rank] H[ardie], 29 Old Mill Terrace, Toronto, Ontario, Canada 1928
Emery, Mrs. Ruth P[rice], 225 Belmont St., Wollaston 70, Massachusetts 1954
EM Emilio, S[hepard] Gilbert, Gilford, New Hampshire ..... (1922) 1938
F Emlen, Dr. John T[hompson], Jr., Department of Zoology, University of Wisconsin, Madison 6, Wisconsin ..... (1925) 1949
English, Almon Owen, 2803 Rosalind Ave., S. W., Roanoke 14, Virginia 1928
English, Dr. P[ennoyer] F[rancis], Agricultural Education Building, Penn State University, University Park, Pennsylvania 1938
Ennis, Dr. J[ames] Harold, Cornell College, Mount Vernon, Iowa .. 1941
Enssler, Harry Thomas, 411 Waverly Rd., Wyncote, Pennsylvania ... 1946
Ephraim, William A[bbe], 530 Riverdale Ave., Yonkers, New York .. 1949
Erickson, Dr. Arnold Burton, Game Res. Unit Bur. Res. & Planning, 600 Shubert Building, St. Paul 2, Minnesota 1936
Erickson, Dr. John G[erhard], 1344 So. Second St., Stillwater, Minnesota 1952
EM Erickson, Dr. Mary Marilla, University of California, Santa Barbara College, Goleta, California ..... (1947) 1950
Erickson, Ray C[harles], 802 So. Arl. Mill Dr., Apt. 11, Arlington 4, Virginia 1946
Ernst, Roger, Mrs., 170 Sargent Road, Brookline, Massachusetts 1956
F Errington, Dr. Paul L[ester], Insectary, Iowa State College, Ames, Iowa ..... (1932) 1952
Eschelman, Dr. Karl F[erdinand], 8 North Drive, Buffalo 16, New York 1949
Evans, Mrs. H. A. J., 1444 Calhoun St., New Orleans 18, Louisiana .. 1956
Evans, J[ohn] Harwood, 327 South Bluff St., Janesville, Wisconsin .. 1948
Evans, Monica Ann, 1306 Oak, Evanston, Illinois 1955
Evans, Mrs. Orry Rowley, 403 Marshall St., Syracuse 10, New York .. 1955
Evans, Roger M., University of Alberta, Edmonton Box 85, Alberta, Canada 1956
Evenden, Dr. Fred G[eorge], Jr., 1336 Fitch Way, Sacramento 25, California 1949
Eyer, Lester E[mery], 515 College St., Alma, Michigan 1948
Eynon, Alfred Ernest, 424 University Farm Place, Madison 5, Wisconsin 1934
Eyre, John Alfred, 460 Gladstone Ave., Toronto 4, Ontario, Canada .. 1946
Eyster, Dr. Marshall B[lackwell], Department of Biology, Box 545, Southwestern Louisiana Institute, Lafayette, Lousiana 1949
Eyster, Philip L., 1023 West King St., York, Pennsylvania 1955

F Farner, Dr. Donald S[ankey], Department of Zoology, The State College of Washington, Pullman, Washington ..... (1941) 1957
Farrar, Merritt C[alvin], 942 Bonita Drive, Winter Park, Florida ... 1946
Farrar, Richard B[artlett], Darien Road, Holland, New York 1957
Farrel, Franklin, 3rd, Northrup Rd., Woodbridge, Connecticut 1950
Farrington, S[elwyn] Kip, Jr., Main St., East Hampton, Long Island, New York 1949
Fautin, Dr. Reed Wingate, Department of Zoology and Physiology, University of Wyoming, Laramie, Wyoming 1938
Fauvel, Bertram A., 263 McLeod St., Ottawa, Ontario, Canada 1948
Faver, Mrs. William H[oward], Eastover, South Carolina 1951
Feely, [Ranger] J[ames] M[ichael], P. O. Box 25, Mtubatuba, Zululand, South Africa 1955
Fegel, Arthur C., Box 840, R. F. D. 1, Rahway, New Jersey 1943
Feinberg, Ezra J[ohn], 41 West 72nd St., New York 23, New York .. 1951
Feingold, Miss Rose, 4206 St. Charles Ave., New Orleans 15, Louisiana 1952
Feinstein, Bernard, 506 A St. N. E., Washington 2, D. C. 1956
Feldman, Albert Edward, 29 Fairview Ave., Kingston, New York ... 1952
Felkel, Lawrence Adelbert, Jr., Box 434, Guymon, Oklahoma 1956
Fennell, Chester M[artin], 19239 Coffinbury Blvd., Fairview Park 26, Ohio 1948
Ferguson, David Sowers, R. F. D., Box 53, Philipsburg, Pennsylvania 1937
Ferguson, William Henry, 5907 Mason St., Omaha, Nebraska 1946
Fernandez, Dra. Ramona, Museo Poey, Catedra "U," Escuela de Ciencias, Universidad de la Habana, Habana, Cuba 1950
Fevold, Harry Richard, 221 S. 13th East., Salt Lake City, Utah 1955
Ficken, Mrs. Robert W., 709 East State St., Ithaca, New York 1955
Field, Lawrence H., 2005 Ridgeway, Colorado Springs, Colorado 1956
Filer, Ervin E., Little Sister Farms, St. David, Illinois 1950
Fillebrown, Thomas Scott, Box 27, Woodstock, Vermont 1947
Fink, Barbara A., 425 Cascadilla Hall, Cornell University, Ithaca, New York 1957
Finlayson, Helen L. [Pease], 7 Harvard St., Springfield, Vermont ... 1956
Finley, Dr. John C., Meaford, Ontario, Canada 1953
Fischer, Dr. Richard B., Department of Rural Education, Cornell University, Ithaca, New York 1947
Fish, Dr. William R[alph], 608 A. Kearsarge St., China Lake, California 1951
F Fisher, Dr. Harvey Irvin, Department of Zoology, Southern Illinois University, Carbondale, Illinois ..... (1944) 1950
Fisher, Walter Taylor, 949 Fisher Lane, Winnetka, Illinois 1932
Fisler, George Frederick, Department of Zoology, University of California, Berkeley 4, California 1955
Fitch, Charles M[arden], 1120 Cove Rd., Mamaroneck, New York .. 1954
EM Fitch, Dr. Henry Sheldon, Natural History Reservation, University of Kansas, R. R. 3, Lawrence, Kansas ..... (1946) 1953
Fitzgerald, Dr. James L[ynn], 130 N. 14th St., Allentown, Pennsylvania 1952
Flach, Major B[engt] [Eriksson], Flygvapnet (Royal Swedish Air Force) Stockholm 80, Sweden 1951
Fleming, Dr. Robert Leland, Shanta Bhawan, Kathmandu, Nepal .. 1955

Fleming, Mrs. Thomas, 1541 Lombardy Rd., Pasadena, California .. 1935
Fluck, Dr. Paul Havens, 73 N. Union St., Lambertville, New Jersey .. 1948
Foley, Edward J[ames], 5349 N. Bay Ridge Ave., Milwaukee 17, Wisconsin 1947
Follett, W[ilbur] I[rving], 3501 Broadway, Oakland 11, California .. 1946
Fontenot, L. Austin, Jr., Ringrose Plantation, Opelousas, Louisiana .. 1953
Forbes, Dr. Henry Stone, 71 Forest St., Milton 86, Massachusetts 1957
L Forbes, Howard M., 87 Church St., Weston, Massachusetts 1953
Forbus, Mrs. Ina B., c/o Watts Hospital, Durham, North Carolina .. 1954
Ford, Norman Lee, Museum of Zoology, University of Michigan, Ann Arbor, Michigan 1956
Ford, Thomas Robert, 3571 Olentangy River Rd., Columbus 14, Ohio 1955
Ford, Winfred N[athan], Jr., Stamford, New York 1949
Fordham, Stephen C[rane], Jr., Delmar Game Farm, Delmar, New York 1946
Foree, Dr. Lynn, 379 30th St., Oakland 11, California 1952
Foster, David Earle, 11 Maine Hall, Bowdoin College, Brunswick, Maine 1957
L Foster, Francis A[pthorp], R. F. D., Box 31-A, Vineyard Haven, Massachusetts 1918
Foster, Prof. G[eorge] W[illiam], Jr., 5109 Flambeau Rd., Madison 5, Wisconsin 1954
L Foster, John Hawley, Wayne, Pennsylvania 1927
Foster, Thomas [Henry], West Rd., Bennington, Vermont 1948
HL Fowler, Henry W[eed], Academy of Natural Sciences, 19th St. and Parkway, Philadelphia, Pennsylvania 1898
Fox, Adrian C[asper], 521 Benjamin Franklin Station, Washington, D. C. 1935
Fox, Elmer Lennard, 1053 Gladmer Park, Regina, Saskatchewan, Canada 1956
Fox, Jennie Ethel, Palisades, Rockland County, New York 1925
Fox, Robert P., 311 Beale St., Wollaston 70, Massachusetts 1951
Fox, Dr. Wade, Jr., Department of Anatomy, Louisiana State University, School of Medicine, New Orleans, Louisiana 1947
Frazier, Frank P[earsall], 424 Highland Ave., Upper Montclair, New Jersey 1951
Fredrickson, Richard William, 203 N. Almond, Carbondale, Illinois 1947
Free, George J[amison], 626 Sunset Rd., State College, Pennsylvania .. 1935
Freeman, Frank Jerome, 2827 Montclaire Dr., N. E., Albuquerque, New Mexico 1947
French, Mrs. Anna Morton, 19 Olyphant Pl., Morristown, New Jersey 1946
L French, Mena Vestal [Mrs. George Edward], Box 171, Wayland, Massachusetts 1923
French, Norman Roger, 627 Tendoy Dr., Idaho Falls, Idaho 1953
L Frey, Mrs. Edith Krieger, 814 3rd St., Jackson, Michigan 1923
Freyburger, Dr. Walter Alfred, Jr., 934 Grant St., Kalamazoo, Michigan 1943
Frieders, Rev. Fabian, O.S.B., St. Meinrad's Abbey, St. Meinrad, Indiana 1950
Friedlander, Norman, 112 W. 44th St., New York, New York 1948
Friedman, Ralph, 14 E. 75th St., New York, New York 1935

F Friedmann, Dr. Herbert, Division of Birds, U. S. National Museum, Washington, D. C. ..... (1921) 1929
Fries, Waldemar H., Little Compton, Rhode Island 1955
Frister, Carl P[hillip], 2956 A. N. 38th St., Milwaukee 10, Wisconsin 1950
Frith, Rowley, 65 Acacia Ave., Ottawa, Ontario, Canada 1947
Fritz, Edward C., 4144 Cochran Chapel Rd., Dallas 9, Texas 1956
Froehlich, Mrs. David E., 229 MacArthur Blvd., Oakland, California 1953
Frye, Ozro Earle, Jr., Game and Fresh Water Fish Commission, Tallahassee, Florida 1947
Fugrmann, Dr. John B[arclay], 5 Main St., Flemington, New Jersey 1950
Fuller, W. A., Canadian Wildlife Service, P. O. Box 2357, Whitehorse, Yukon Territory, Canada 1950
Funk, Richard Cullen, 316 Plum St., Fort Collins, Colorado 1957
F Gabrielson, Dr. Ira N[oel], R. R. 1, P. O. Box 349, Oakton, Virginia (1912) 1938
Gaillard, Stephen Lee, 9 Lee Place, Bronxville, New York 1941
Gaines, Arthur, 40 Wall St., New York 5, New York 1952
Gainey, Louis Franklin, Box 2519, Lantana, Florida 1950
Gale, Kenneth M., 828 Adair Ave., Zanesville, Ohio 1956
Galley, John E[dmond], 1610 W. Holloway Ave., Midland, Texas .. 1949
Galloway, S/Sgt. Leo A[ldis], Blue Grass Trailer Park, 4309 Parker Ave., West Palm Beach, Florida 1951
Gallup, Fred[erick] N[orman], 142 W. 6th Ave., Escondido, California 1948
Galt, William L., 436 Walnut Ave., Aldan, Clifton Heights, Pennsylvania 1955
Gambrill, Mrs. Richard V. N. [Edith B.], Vernon Manor, Peapack, New Jersey 1951
Gamero, Antonio, 4207¾ Laurel Canyon Blvd., North Hollywood, California 1953
Gammell, Ann M. [Mrs. Robert T.], Kenmare, North Dakota 1952
Gammell, Dr. Robert T., Kenmare, North Dakota 1942
EM Ganier, Albert F., 2112 Woodlawn Dr., Nashville 12, Tennessee (1917) 1934
Gantz, R[obert] J. M., R. D. 2, Doylestown, Bucks County, Pennsylvania 1949
HL Gardiner, Charles Barnes, 133 W. Main St., Norwalk, Ohio 1903
Gardner, Dr. Leon L., 3129 Freeman St., San Diego 6, California 1957
Gardner, Merriel M[aslin] [Mrs. I. C.], 9531 E. Stanhope Rd., Kensington, Maryland 1943
Garlick, Gordon Mark, R. R. 1, Box 408, Lake Orion, Michigan ... 1953
Garrett, [Mary] Lois, 1709 Chestnut St., Kenova, West Virginia 1949
Garrey, Mrs. Walter E., 39 Orchard Ave., Waban 68, Massachusetts 1957
Garrison, David L[loyd], Old Lexington Rd., Lincoln, Massachusetts 1949
Garrity, Devin A[dair], 682 Forest Ave., Rye, New York 1947
Garvan, Mrs. Francis P., 740 Park Ave., New York 21, New York 1948
Gary, W[ilbur] Y[ocum], P. O. Box 1791, Jacksonville 1, Florida 1950
Gashwiler, Jay S., U. S. Fish and Wildlife Service, Snell Hall, Oregon State College, Corvallis, Oregon 1939
Gasparec, Samuel, Box 88, Homer, Alaska 1953
Gates, Doris, Faculty Apts., Chadron, Nebraska 1952

Gates, Frank Ward R[isdon], 156 Garfield Rd., West Hartford 7, Connecticut 1928
Gates, John M., Cooperative Wildlife Res. Unit, Utah State Uni., Logan, Utah 1957
L Gauntlett, Frederic John, 5802 Kirkside Dr., Chevy Chase 15, Maryland 1925
Geale, B[everley] B., 109 Glenview Ave., Toronto, Ontario, Canada 1952
Gee, John P., 6120 Carlisle Court, New Orleans 14, Louisiana 1957
Geiger, Lewyn E[dward], P. O. Box 146, Wellborn, Florida 1957
Gelatis, Mrs. Lee H. [Lillian R.], 234 S. Maple Ave., Apt. G-1, Oak Park, Illinois 1952
Genelly, Dr. Richard E., Humboldt State College, Arcata, California 1952
Gensch, Robert H[enry], 105 Clark Ave., Billings, Montana 1938
George, Dr. John L[othar], Division of Conservation, Vassar College, Poughkeepsie, New York 1950
George, William Gordon, 240 N. Bean Ave., Tucson, Arizona 1956
Gerstell, Richard, 355 N. West End Ave., Lancaster, Pennsylvania .. 1939
Ghiselin, Jon [Brewster], 1747 Princeton Ave., Salt Lake City 8, Utah 1954
Gibbs, Harold N., A-71 Sowams Rd., Barrington, Rhode Island 1939
Gibbs, Dr. Robert Henry, Jr., Woods Hole Oceanographic Institute, Woods Hole, Massachusetts 1947
Gier, Dr. Herschel T[homas], Department of Zoology, Kansas State College, Manhattan, Kansas 1937
Giesler, J[ohn] Calvin, 7206 S. E. Powell, Portland 6, Oregon 1950
Gifford, Dr. Harold, 3636 Burt St., Omaha 3, Nebraska 1946
Gift, Robert F[ranklin], 935 Washington Ave., Lewisburg, Pennsylvania 1950
Gilbert, Albert Earl, 2231 North Menard Ave., Chicago 39, Illinois .. 1956
Gilbert, Dr. Perry W[ebster], Zoology Department, Stimson Hall, Cornell University, Ithaca, New York 1939
Gilchrist, Kennedy Wenger, 2711 Colfax Ave., Evanston, Illinois ... 1955
Giles, Lester A[lsbra], Jr., American Humane Education Society, 180 Longwood Ave., Boston 15, Massachusetts 1953
Giles, Norman H[enry], Jr., Osborn Botanical Laboratory, Yale University, New Haven, Connecticut 1930
Giles, William G., 22 Humewood Gardens, Toronto 10, Ontario, Canada 1954
Gill, Geoffrey, 24 Overlook Dr., Huntington, Long Island, New York 1940
Gillespie, Mrs. Harold S[halor] [Majorie K.], 655 Church St., Bound Brook, New Jersey 1951
EM Gilliard, E[rnest] Thomas, American Museum of Natural History, 79th St. and Central Park West, New York 24, New York (1938) 1950
Gilmore, William, 2820 Butte, Santa Clara, California 1956
Ginés, Hno., Sociedad de Ciencias Nat. La Salle, Apartado 681, Caracas, Venezuela 1955
Glasgow, Leslie L., Louisiana State University, School of Forestry, Baton Rouge, Louisiana 1952
Glenn, Robert W[ycoff], 509 Orchard Ave., Avalon, Pittsburgh 2, Pennsylvania 1937
Glenny, Fred H., 1148 Linden Ave., Akron 10, Ohio 1947
Glick, Bruce, Box 185, State College, Mississippi 1948

Glore, W[alter] S[cott], Jr., Danville, Kentucky 1952
Glover, Dr. Fred A., 2211 Holmes Run Dr., Falls Church, Virginia .. 1945
Gloyd, Dr. Howard K[ay], Chicago Academy of Sciences, 2001 N. Clark St., Chicago 14, Illinois 1939
Gluck, S. Norris, 305 Beauregard St., Charleston, West Virginia 1955
F Godfrey, W[illiam] Earl, National Museum of Canada, Ottawa, Ontario, Canada ..... (1942) 1955
Goebel, Herman, 78–52 80th St., Brooklyn 27, New York 1947
Goelet, Robert G., 546 Fifth Ave., New York 36, New York 1952
Goelitz, Walter A[dolph], P. O. Box 58, Milford, Pennsylvania 1916
Goethe, C. M., Anglo-National Bank Bldg., Seventh and J St., Sacramento 14, California 1947
Goetz, Christian J[ohn], 3503 Middleton Ave., Cincinnati 20, Ohio .. 1929
Goff, Milton R[eeder], 95 Landing Rd. N., Rochester 10, New York 1949
Goldman, Luther Chase, Fish & Wildlife Service, Box 739, San Benito, Texas 1947
EM Good, Rev. Albert I., 819 Quinby Ave., Wooster, Ohio ..... (1939) 1948
Good, Dr. Ernest Eugene, Department of Zoology and Entomology, Ohio State University, Columbus 10, Ohio 1954
Gooden, Sam[uel] K[napp], 120 Dean, Hot Springs, Arkansas 1951
Goodlett, Mrs. Catherine Evans, 636 Skyview Dr., Nashville 6, Tennessee 1957
Goodman, Jeanne Moore, Department of Biology, University of Redlands, Redlands, California 1947
Goodpasture, Katherine Anderson, [Mrs. Ernest W.], 9716 Elrod Road, Kensington, Maryland 1950
Goodridge, Edwin T., Province Line Rd., Princeton, New Jersey 1946
L Goodwill, E. V., Hydrographic Service, Department of Mines and Technical Surveys, Ottawa, Ontario, Canada 1942
L Goodwin, Clive Edmund, 38 Walsh Ave., Weston, Ontario, Canada 1952
Goodwin, Margaret S., Earnley, 38 Oakbourne Rd., West Chester, Pennsylvania 1942
Goodwin, Robert E., 224 Bryant Ave., Ithaca, New York 1952
Gordon, David C[harles], 158 Haley St., Watertown, New York 1951
Gordon, Harry E[dgar], 307 Laburnum Crescent, Rochester 20, New York 1911
Gordon, Malcolm S[tephen], Department of Zoology, University of Cambridge, Cambridge, England 1952
Gordon, Seth E[dwin], 926 J St., Sacramento, California 1924
Goslin, Charles R., 726 E. King St., Lancaster, Ohio 1936
Gottsch, Werner H[enry], 8110 Cargill, Houston 15, Texas 1948
Gould, Edwin, 310 Dinwiddie Hall, Department of Zoology, Tulane University, New Orleans, Louisiana 1954
Gould, Patrick Jerry, 12137 Redberry, El Monte, California 1954
Gow, John P., 13048 Sherbrooke Ave., Edmonton, Alberta, Canada .. 1955
Graber, William J[ames], III, 695 Twentieth St., Beaumont, Texas .. 1951
Grace, Lucile C., [Mrs. C. J.], Hilton's Rd., Slingerlands, New York .. 1944
Graf, Dr. William, Department of Natural Sciences, San Jose State College, San Jose 14, California 1953
Graff, George S., 830 Jefferson St., St. Charles, Missouri 1951

	Graham, Hatch, Jr., c/o U. S. Forest Service, Sawyers, California ...	1950
	Graham, Hatch, Sr., 10300 Viretta Lane, Los Angeles 24, California ..	1947
	Graham, Dr. John Cooper, 80 Hanson Place, Brooklyn 17, New York	1949
	Grant, Dr. Adele Lewis, 6019 S. Overhill Dr., Los Angeles 43, California	1947
	Grant, Cleveland P[utnam], 245 Davis St., Mineral Point, Wisconsin	1924
	Grant, Robert H[arvey], 2415 Newkirk Ave., Brooklyn 26, New York	1943
	Gray, Gifford George, 2795 E. 16th Ave., Vancouver 12, British Columbia, Canada	1955
	Grayce, Robert L[amb], 141 Main St., Rockport, Massachusetts	1947
	Greeley, Frederick, Illinois Natural History Survey, Urbana, Illinois	1937
	Green, Horace O., 86 Greenwood Ave., Greenwood, Massachusetts ..	1954
	Greene, Dr. David G[orham], 88 Ashland Avenue, Buffalo 22, New York	1954
EM	Greene, Earle R[osenbury], 418 S. Holt Ave., Los Angeles 48, California ..... (1921)	1942
	Greene, Philip S., 502 Claremont Ave., Kenmore 23, New York	1955
L	Greenewalt, Crawford H., Greenville, Delaware	1956
	Greenhalgh, Clifton M., P. O. Box 326, Murray, Utah	1944
	Greenig, Mrs. Patricia F[aye], 2 South Rd., Harrison, New York ...	1957
HL	Greenough, Henry V[oss], "Greenhold Farm," Maple St., Carlisle, Massachusetts	1901
	Greenwalt, Ernest J[agger], National Elk Refuge, Jackson, Wyoming	1932
	Greenwalt, Leon, 911 S. Seventh St., Goshen, Indiana	1949
F	Greenway, James Cowan, Jr., Museum of Comparative Zoology, Cambridge 38, Massachusetts ..... (1930)	1948
	Greer, Theodore R., Enchanted Hill Garden, Joy, Illinois	1957
	Gregg, Peter Alan, Box 100, Grand Falls, Newfoundland, Canada ..	1954
EM	Gregory, Stephen S[trong], Box N, Winnetka, Illinois ..... (1906)	1934
	Gregory, Robert S., R. R. 1, Mooresville, Indiana	1947
	Gregory, Tappan, 105 S. La Salle St., Chicago, Illinois	1931
	Griffee, W. E., 510 Yeon Bldg., Portland 4, Oregon	1944
EM	Griffin, Dr. Donald R[edfield], Biological Laboratories, Harvard University, Cambridge 38, Massachusetts ..... (1936)	1947
EM	Griffin, William W[elcome], 3232 Pine Ridge Rd., N. E., Atlanta, Georgia ..... (1946)	1957
EM	Grimes, Samuel Andrew, 4627 Peachtree Circle E., Jacksonville, Florida (1925)	1951
	Grimm, Forrest C[raver], 514 S. Willis St., Champaign, Illinois	1951
	Grimm, William C., Blueberry Park, Rt. 3, Greenville, South Carolina	1943
	Grinnell, Hilda Wood [Mrs. Joseph], 3016 Benvenue Ave., Berkeley 5, California	1931
L	Grinnell, Lawrence I[rving], 710 Triphammer Rd., Ithaca, New York	1938
F	Griscom, Ludlow, 21 Fayerweather St., Cambridge 38, Massachusetts (1908)	1925
	Griswold, John Augustus, Jr., The Zoological Society, 34th St. and Gerard Ave., Philadelphia 4, Pennsylvania	1933
	Groesbeck, William M[aynard], 376 Seneca Rd., Hornell, New York	1949
EM	Gromme, Owen J., Milwaukee Public Museum, Milwaukee, Wisconsin (1924)	1939

F Gross, Dr. Alfred Otto, 11 Boody St., Brunswick, Maine ..... (1907) 1930
Groth, William L., Jr., 04042030, "A" Battery, 90th F. A. Bn., A.P.O. 25, San Francisco, California 1952
Groves, I. Norris, 1216 Washington, Beardstown, Illinois 1955
Groves, Dr. James Walton, Highfield Crescent, Britannia Heights P. O., Ottawa, Ontario, Canada 1952
Grow, Raymond J., 513 West 5th Ave., Apt. 7, Gary, Indiana 1953
Grube, George E[dward], Science Department, State Teachers College, Lock Haven, Pennsylvania 1943
Gruenewald, Robert F[ranklin], Box 184, Clifton, Illinois 1957
Gudmundsson, Dr. Finnur, Natturugripasafnid (Museum of Natural History), P. O. Box 532, Reykjavik, Iceland 1949
L Guernsey, Raymond G[ano], Eden Terrace, Poughkeepsie, New York 1928
Guillaudeu, Dr. Robert L[ee], 5806 Dean Dr., Falls Church, Virginia 1956
EM Gullion, Gordon W[right], Box 337, Austin, Nevada ..... (1946) 1953
Gumbart, William B., 205 Church St., New Haven 9, Connecticut .. 1948
LEM Gunn, W[illiam] W[alker] H[amilton], 178 Glenview Ave., Toronto 12, Ontario, Canada ..... (1935) 1951
Gunter, Dr. Gordon, Gulf Coast Research Laboratory, Ocean Springs, Mississippi 1948
Guthrie, Dr. Donald, Robert Packer Hospital, Sayre, Pennsylvania .. 1930
Guthrie, Henry B., 169 East 70th St., New York 21, New York 1953
Haberyan, Dr. H. D., 13 Poplar Circle, Gulfport, Mississippi 1956
Hackman, C[harles] Douglas, Lilac Lane, Fullerton, Maryland 1953
Haftorn, Svein, Library of Det Kongelige Norske, Videnskabers Selskab, Trondheim, Norway 1954
Haga, Ryoichi, No. 25 Odori, Sapporo, Hokkaido, Japan 1954
Hagar, Donald C[hisholm], Jr., Ranger Station, Salyer, California .. 1954
Hagar, Mrs. Jack [John David], Rockport, Texas 1937
EM Hagar, Joseph A[rchibald], Marshfield Hills, Massachusetts .. (1935) 1939
Hagenstein, Walter M., Medina, Washington 1946
Hague, Dr. Florence S[ander], Sweet Briar College, Sweet Briar, Virginia 1950
Hailman, Jack Parker, 4401 Gladwyne Dr., Bethesda 14, Maryland 1955
Haines, Bertram W[illiams], Rt. 2, Westminster, Maryland 1954
Haines, Robert L[ee], 54 E. Main St., Morristown, New Jersey 1924
Hake, Theodore R., 1553 Wayne Ave., York, Pennsylvania 1952
Halberg, Mrs. Henry N., 136 Arborway, Jamaica Plain 30, Massachusetts 1947
Hale, James B[all], 405 Washburn Place, Madison 3, Wisconsin 1955
Hall, Edward M[cMurtry], 7620 S. College Ave., Whittier, California 1947
Hall, Dr. E[ugene] Raymond, Museum of Natural History, University of Kansas, Lawrence, Kansas 1938
Hall, Fred T., Buffalo Museum of Science, Humboldt Park, Buffalo 11, New York 1939
Hall, George A[rthur], Department of Chemistry, West Virginia University, Morgantown, West Virginia 1949
L Hall, Willis, 1111 Douglas Ave., Yankton, South Dakota 1948
Haller, Mrs. C. J. [Margaret], 83 East Main St., Avon, New York .. 1955
Halliday, Hugh M., 35 Don River Blvd., Willowdale, Ontario, Canada 1952

Hallman, R[oy] C[line], P. O. Box 37, St. Andrew Station, Panama City, Florida 1928
Halloran, Arthur F[ranklin], Wichita Refuge, Cache, Oklahoma 1949
L Hamann, Carl F[erdinand], Maple Lane, Aurora, Ohio 1951
EM Hamerstrom, Dr. F[rederick] N[athan], Jr., R. F. D., Plainfield, Wisconsin ..... (1939) 1941
Hames, Mrs. Frances T., 1230 von Phister St., Key West, Florida ... 1954
Hamilton, Charles W., 2639 Fenwood, Houston 5, Texas 1947
Hamilton, G[olden] Dale, 2550 Murray St., Shreveport 51, Louisiana 1949
Hamilton, Mrs. R. E. [Anne P.], 704 Greenwood Dr., Dalton, Georgia 1952
Hamilton, Terrell Hunter, Biological Laboratories, 16 Divinity Ave., Cambridge 38, Massachusetts 1953
Hamilton, Miss Viola, 110 Sawyer, Denton, Texas 1957
Hamilton, Dr. W[illiam] J[ohn], Jr., Department of Conservation, Cornell University, Ithaca, New York 1924
Hamilton, William J., III, Museum Vertebrate Zoology, University of California, Berkeley 4, California 1951
Hammond, Merrill C[lyde], Lower Souris Refuge, Upham, North Dakota 1937
Hammond, Dr. Roland, 41 Boylston Ave., Providence 6, Rhode Island 1924
Hammond, Ross E., 2210 25th St., Lubbock, Texas 1956
Hampe, Irving Edward, 5559 Ashbourne Rd., Baltimore 27, Maryland 1933
Hamrum, Charles Lowell, Department of Biology, Gustavus Adolphus College, St. Peter, Minnesota 1948
Hancock, Douglas, 285 Durie Ave., Closter, New Jersey 1954
Hancock, James W., Rt., 1, Madisonville, Kentucky 1954
L Hand, Ralph L[evi], 415 West Central, Missoula, Montana 1929
Handley, Dr. Charles Overton, Jr., U. S. National Museum, Washington 25, D. C. 1941
EM Handley, Charles Overton, Sr., 6571 Roosevelt Ave., Charleston, West Virginia ..... (1916) 1948
Handley, John McNeel, 6571 Roosevelt Ave., Charleston, West Virginia 1947
Hanlon, Robert Wm., Department of Biology, St. Augustine's College, Nassau, Bahamas 1951
EM Hann, Dr. Harry W[ilbur], 1127 Church St., Ann Arbor, Michigan ..... (1930) 1942
Hanna, Dr. G. Dallas, California Academy of Sciences, Golden Gate Park, San Francisco 18, California 1930
Hanna, Mrs. Hilery E[mmett], 901 W. Cedar, El Dorado, Arkansas 1954
Hanna, Wilson Creal, 712 N. Eight, Colton, California 1919
Hansen, Charles G., Box 113, Burns, Oregon 1955
EM Hanson, Harold C[arsten], Illinois Natural History Survey, Resources Bldg., Urbana 11, Illinois ..... (1937) 1952
Hanson, Rossalius C[hrist], Mrs. 5829 Drew Ave. S., Edina 10, Minnesota 1950
Hanson, Thomas [Lyman], 302 Valley View Apts., Allentown, Pennsylvania 1949
Hanson, Dr. William R[oderick], Illinois Natural History Survey, Urbana, Illinois 1947
Harbeson, Ben, R. R. 4, Paris, Kentucky 1948

L Harding, Magnus S., Box 575, Madison 1, Wisconsin 1954
Harding, Mrs. Margaret R[ose], 526 S. Van Ness Ave., Santa Ana, California 1952
Hardy, Frederick C., 508 Nicholas Ave., Somerset, Kentucky 1949
Hardy, John William, Museum of Natural History, University of Kansas, Lawrence, Kansas 1953
Hardy, Dr. Ross, Department of Biological Sciences, Long Beach State College, Long Beach 15, California 1938
Hartford, Dr. Henry M[inor], 1400 Vermont St., Quincy, Illinois 1939
Hargrave, Lyndon Lane, Box 1979, Globe, Arizona 1950
L Harley, James Bickel, R. R. 1, Pottstown, Pennsylvania 1946
Harmon, Raymond R., Sr., P. O. Box 217, Byron, Illinois 1954
HLEM Harper, Dr. Francis, 115 Ridgway St., Mt. Holly, New Jersey .. (1907) 1917
Harrington, H. Warren, Jr., 19 Holborn St., Milton 86, Massachusetts 1956
Harrington, Dr. Paul, 813 Bathurst St., Toronto, Ontario, Canada .. 1922
Harrington, Winthrop Wendell, Jr., 1900 Massachusetts Avenue, Lexington 73, Massachusetts 1957
Harris, Lucien, Jr., 61 Clarendon Ave., Avondale Estates, Georgia 1930
Harris, Robert D., Canadian Wildlife Service, Northern Affairs, Room 433 Post Office Building, Edmonton, Ontario, Canada 1952
Harris, S. Arthur, 2318 Aldrich Ave., So., Minneapolis, Minnesota 1954
Harris, Dr. Stuart Kimball, R. F. D. 4, Georgetown, Massachusetts .. 1940
Harris, William Geo[rge] F[owle], 147 Hillside St., Milton 86, Massachusetts 1933
L Harrison, Ed N[ewton], 1134 Glendon Ave., Los Angeles 27, California 1934
Harrison, Hal H., 1102 Highland St., Tarentum, Pennsylvania 1944
Harrower, Dr. D[avid] E[lson], Newton, Connecticut 1933
Hart, John H., 2700 Verona Rd., Kansas City 15, Missouri 1957
Hart, W[illiam] S[tephen], 62 Forden Crescent, Westmount 6, P.Q., Canada 1926
Harte, Ken, 30 Brunswick Ave., Troy, New York 1952
EM Hartman, Dr. Frank A[lexander], Hamilton Hall, Ohio State University, Columbus, Ohio ..... (1941) 1957
Hartshorne, Charles, 2075 Ridgwood Dr., N. E., Atlanta 7, Georgia 1951
L Hartshorne, James Mott, Fernow Hall, Cornell University, Ithaca, New York 1946
Harwell, Charles Albert, 2630 Hilgard Ave., Berkeley, California 1943
Hasek, Dr. Vaclav Ondrej, 210 Granby Bldg., Cedar Rapids, Iowa ... 1955
Haskell, Mrs. Lester W., 231 E. Creston Ave., Des Moines 15, Iowa .. 1957
Hatch, Miss [Clara] Grenville, 3127 Alika Ave., Honolulu 17, Hawaii 1950
Hath, Earl Herbert, 2109 Briar Gate Lane, Kirkwood 22, Missouri .. 1952
Hatton, Mrs. Louise M., 200 Calera Canyon Rd., Salinas, California .. 1956
HL Havemeyer, H[enry] O[sborne], Mahwah, New Jersey 1893
Hawbecker, Albert C., Fresno State College, Fresno, California 1947
Hawkins, Mrs. Agnes, Rt. 4, Box 752, Phoenix, Arizona 1954
Hawkins, L[eslie] G., P. O. Box 1663, Los Alamos, New Mexico 1947
Hawksley, Dr. Oscar, Central Missouri State College, Warrensburg, Missouri 1943
Hayman, Robert G[ene], R. F. D. 1, Carey, Ohio 1951
Hayne, Dr. Don W[illiam], Institute for Fisheries Research, Museum Annex, University of Michigan, Ann Arbor, Michigan 1950

Haynsworth, W[illiam] F[rancis] B[aker], Box 100, Route 3, Sumter, South Carolina 1950
Hays, Helen, 516 Hudson St., New York, New York 1954
Healy, Joseph F[rancis], 3520 N. Paulina St., Chicago 13, Illinois 1950
Heard, Miss Bessie, 315 College, McKinney, Texas 1955
EM Hebard, Frederick V[anuxem], 1500 Walnut St. Bldg., Philadelphia, Pennsylvania ..... (1930) 1951
Hebditch, G[erald] A[ubrey], M.B.O.U., 92 Rydes Hill Road, Guildford, Surrey, England 1949
Heckler, S. B., 1207 No. 7th St., St. Louis 6, Missouri 1948
Heckscher, Stevens, 47 Cross St., Belmont 78, Massachusetts 1952
Hedges, Harold C[harles], R. R. 2, Quivira Lake, Kansas City 3, Kansas 1946
Hefley, Harold M., Panhandle A. and M. College, Goodwill, Oklahoma 1947
Heilborn, [Klas] Axel, 1020 Creekside Dr., Niagara Falls, New York 1949
Heimerdinger, Miss Mary A., Department of Biology, Wiltonberg College, Springfield, Ohio 1953
Heiser, Joseph M[athew], Jr., 1724 Kipling St., Houston 6, Texas .. 1939
Helbert, Dr. Hollen G[arber], 338 Monticello Ave., Harrisonburg, Virginia 1954
L Helleiner, Frederick M., Box 14, Swastika, Ontario, Canada 1947
Helmer, Mrs. John H., 847 Ridge Ave., Evanston, Illinois 1954
Helms, Carl W., Biological Laboratories, Harvard University, 16 Divinity Ave., Cambridge, Massachusetts 1952
Hemp, O. C., 231 Churchville Ave., Staunton, Virginia 1954
Hemphill, Dr. Donald Vincent, Pacific Union College, Angwin, California 1957
Henders, Stanley M., P. O. Box 421, Calgary, Alberta, Canada 1955
Henderson, Mrs. Alexander, 337 Aycrigg Ave., Passaic, New Jersey .. 1946
Henderson, Archibald Douglas, R. R. 1, Dunstable, Alberta, Canada 1949
Henderson, Mrs. William L., Gibson Island, Maryland 1953
Hendricks, G[eorge] Bartlett, Berkshire Museum, Pittsfield, Massachusetts 1935
Hendricks, Gene Thompson [Mrs. Philip], 1839 Wyoming Ave., Billings, Montana 1947
Hendrickson, Dr. George O[scar], Department of Zoology and Entomology, Science Hall, Iowa State College, Ames, Iowa 1943
Henney, Mrs. Nella B[raddy], 111 Fifth St., Garden City, New York 1950
L Henningsen, Lillian [Mrs. Harold P.], 124 Cambridge Way, Piedmont 11, California 1953
Henry, Cordia J[ohn], Seney National Wildlife Refuge, Seney, Michigan 1934
Hensley, Jack, Department of Zoology, University of Arizona, Tucson, Arizona 1957
Hensley, M[arvin] Max, Department of Zoology, Michigan State University, East Lansing, Michigan 1949
Herbert, Kathleen Green [Skelton], Liston Front Range Lighthouse, R. R. 2, Middletown, Delaware 1949
Herman, Dr. Carlton M[artin], Patuxent Research Refuge, Laurel, Maryland 1951
Herndon, Dr. Lee R., 1533 Burgie Place, Elizabethton, Tennessee .. 1946

EM Hersey, F[rank] Seymour, 435 Bay Road, Easton, Massachusetts (1911) 1916
Herz, Josephine D. [Mrs. M. E.], Rt. 4, Excelsior, Minnesota 1957
Hewitt, Dr. Oliver H[arold], Department of Conservation, Fernow Hall, Cornell University, Ithaca, New York 1944
Heywood, Philip B., 332 Main St., Worcester 8, Massachusetts 1947
L Hibbert, Mrs. Harold, Bettws-Y-Coed, Yarrow St., Bryn Mawr, Pennsylvania 1926
F Hickey, Dr. Joseph J[ames], 424 University Farm Place, Madison 5, Wisconsin ..... (1936) 1954
EM Hickey, Margaret Brooks [Mrs. J. J.], 5517 Dorsett Drive, Madison 5, Wisconsin ..... (1933) 1952
L Hicks, Thomas W[illiam], 517 E. Sunshine St., Springfield 4, Missouri 1948
Higgins, Norman Calvin, 516 Missouri, Warrensburg, Missouri 1956
Highley, Seward T[rainer], 43 Powder House Rd., Medford 55, Massachusetts 1953
Hight, Gordon Lee, Jr., Box 1626, Rome, Georgia 1953
L Hildreth, Miss Mary A., Park St., Haverhill, New Hampshire 1947
L Hill, Julian W[erner], 1106 Greenhill Ave., Wilmington, Delaware .. 1934
Hill, Miss Margaret Louise, 4200 Shoal Creek, Austin 5, Texas 1956
Hill, Dr. Norman P[ierce], 2308 Highland Ave., Fall River, Massachusetts 1943
Hill, Robert B., 3184 Woodlawn, Shreveport, Louisiana 1957
Hill, William P., "Millrace," Peterborough, New Hampshire 1955
Hill, Dr. W. W., Department of Anthropology, University of New Mexico, Albuquerque, New Mexico 1951
L Hinchman, Richard M[ay], Boston Road, Groton, Massachusetts .. 1930
Hinds, Frank J., Department of Biology, Western Michigan College, Kalamazoo, Michigan 1935
Hines, Joseph A[ustin], 30-12 49th St., Long Island City 3, New York 1947
Hinshaw, Thomas D[oane], 1827 San Juan Ave., Berkeley 7, California 1930
Hipple, Byron T[homas], Jr., 114 Chestnut St., Albany 10, New York 1949
Hirshberg, Eliot P[aul], 72 Mamaroneck Rd., Scarsdale, New York .. 1952
Hitchcock, Dr. Harold B., Department of Biology, Middlebury College, Middlebury, Vermont 1939
LF Hochbaum, H[ans] Albert, Delta, Manitoba, Canada ..... (1942) 1957
Hock, Dr. Raymond J., Arctic Aeromedical Lab., A.P.O. 731, Seattle, Washington 1946
Hodge, Dr. George E[splin], 53 Belvedere Circle, Westmount, Montreal, Canada 1951
Hodges, [Jim] James, 1514 East High St., Davenport, Iowa 1946
Hoffman, Mary C. [Mrs. G. R.], 247 St. James St., Apt. 8, London, Ontario, Canada 1948
L Hoffman, Dr. Lucas, Tour du Valat, Par le Sambuc, R.D.Rh., France 1955
Hoffmeister, Linus C[hristian], 504 W. Ripa, Lemay 23, Missouri .. 1939
Hofslund, Dr. Pershing B[ernard], Biology Department, Duluth Branch, University of Minnesota, Duluth, Minnesota 1948
Hoiberg, Dr. Arnold John, Research Laboratories, The Flintkote Company, Whippany, New Jersey 1948
Holcomb, Miss Carrie, 1008 Missouri, Houston 6, Texas 1956
Holcombe, Alexander H., Jr., 1330 Young's Ford Rd., Gladwyne, Pennsylvania 1949

	Holden, Mrs. David J., 804 13th Ave., Brookings, South Dakota	1953
	Holden, Fenn M[itchell], Box 428, Grayling, Michigan	1952
	Holden, Raymond P., Whippoorwill Hill, North Newport, New Hampshire	1956
	Holdom, Canon M[artin] W[ebber], Lindsay Cottage, Crescent Beach, British Columbia, Canada	1950
	Holgersen, Dr. Holger, Stavanger Museum, Stavanger, Norway	1949
	Holland, Harold May, Box 615, Galesburg, Illinois	1910
	Holman, J. Alan, Department of Biology, University of Florida, Gainesville, Florida	1957
	Holman, John Paulison, Fairfield, Connecticut	1922
	Holman, Robert C., 242 Green St., Mifflinburg, Pennsylvania	1947
	Holmberg, Miss Severena C[aroline], 4827 Woodlawn Blvd., Minneapolis 17, Minnesota	1949
	Holmes, Richard T[urner], 132 Junipero, San Gabriel, California ..	1956
EM	Holt, Ernest G[olson], c/o Miss Olivia Holt, 555 South Lawrence St., Montgomery 5, Alabama ..... (1911)	1925
	Hood, William Richard, 300 N. W. 19th, Oklahoma City, Oklahoma	1952
	Hoover, Dr. Kenneth B[ert], Grantham, Pennsylvania	1953
	Hopkins, Milton N[ewton], Jr., 202 W. Roanoke Dr., Fitzgerald, Georgia	1950
	Horsey, R[ichard] E[dgar], 320 Eaglehead Rd., East Rochester, New York	1919
	Horton, Jack Ogilvie, Jr., 622 Laughlin Hall, Princeton University, Princeton, New Jersey	1957
L	Hough, Fred, Accord 1, New York	1955
	Hough, Prof. John N[ewbold], 1515 Mariposa, Boulder, Colorado ..	1946
L	Houston, C[larence] Stuart, Box 279, Yorkton, Saskatchewan, Canada	1943
	Hovingh, Peter, Jr., Allendale, Michigan	1955
LF	Howard, Dr. Hildegarde [Mrs. H. Anson Wylde], Los Angeles County Museum, Exposition Park, Los Angeles 7, California .... (1928)	1946
	Howard, Julian A[ndrew], Wichita Mountains Wildlife Refuge, Cache, Oklahoma	1954
	Howe, Dr. H[enry] Branch, Jr., Department of Biology, Wake Forest College, Winston-Salem, North Carolina	1943
LEM	Howell, A[lfred] Brazier, Alna, Maine ..... (1909)	1922
EM	Howell, Dr. Joseph C[orwin], Zoology and Entomology Department, University of Tennessee, Knoxville, Tennessee ..... (1928)	1949
	Howell, Thelma, Wesleyan College, Macon, Georgia	1947
EM	Howell, Dr. Thomas R[aymond], Department of Zoology, University of California, Los Angeles 24, California ..... (1948)	1953
	Howes, Paul Griswold, The Bruce Museum, Bruce Park, Greenwich, Connecticut	1951
	Howsley, L[ucien] R[eeder], 1304 Aetna St., Anaheim, California ..	1950
	Hoy, Nelson D., 500 Sharon Ave., Sharon Hill, Pennsylvania	1943
L	Hoyt, Dr. Sally F. [Mrs. J. Southgate Y.], Laboratory of Ornithology, Cornell University, Ithaca, New York	1940
	Hubbs, Dr. Carl L., Scripps Institution of Oceanography, La Jolla, California	1947
	Hubert, Philip A[rthur], Jr., P. O. Box 618, Bellport, Long Island, New York	1949

EM Hudson, Dr. George E[lford], 503 Side St., Pullman, Washington (1928) 1948
Huenecke, Howard S., Sand Lake National Wildlife Refuge, Columbia, South Dakota 1952
EM Huey, Laurence M., Natural History Museum, Balboa Park, San Diego, California ..... (1920) 1932
Huff, Prof. N. L., 1219 7th St. S. E., Minneapolis 14, Minnesota 1924
Hughes, Dr. S[helby] B[ond], 521 E. Jefferson St., Clinton, Missouri 1949
Hughes, Stuart W., 156 Orchard St., Newark 2, New Jersey 1955
Hughes, Wallace, 305 Mayo, Tallahassee, Florida 1947
L Hughes, William M., 8755 Southwest Marine Drive, Vancouver 14, British Columbia, Canada 1953
Hull, Mrs. Celina C., Box 32, Terrace, British Columbia, Canada ... 1957
Humphrey, James [Rae], 3010 Lowell Blvd., Denver 11, Colorado .. 1949
Humphrey, Dr. Philip Strong, Peabody Museum of Natural History, Yale University, New Haven 11, Connecticut 1947
Hundley, Mrs. Margaret Haskell, P. O. Box 158, Stonington, Maine 1956
L Hunnewell, Miss Louisa, 848 Washington St., Wellesley, Massachusetts 1936
Hunt, Dr. Gerald Marshall, 3911 Alicia Dr., San Diego 7, California 1952
Hunt, Miss Helen C[ummings], Washington, Connecticut 1928
Hunt, L[awrence] Barrie, 203 South 16th St., Richmond, Indiana .. 1954
Hunt, Richard Allen, 318 West Lake Street, Horicon, Wisconsin 1952
Hunter, Isaac R., Route 3, Dowagiac, Michigan 1955
Hunter, John, R. R. 2, Saskatoon, Saskatchewan, Canada 1954
Huntington, Dr. Charles E[llsworth], Department of Biology, Bowdoin College, Brunswick, Maine 1949
Hurlbutt, Miss Catherine A., 1910 So. Marion St., Denver 10, Colorado 1947
Hurley, John Beatty, 401 S. 17th Ave., Yakima, Washington 1946
Hurlock, Miss Phyllis L., R. D. 1, Coatesville, Pennsylvania 1957
Hurrie, David, Apt. 8C, Devonshire Apartments, Brockville, Ontario, Canada 1952
Hussey, Miss Lois J[ackson], 205 East 72nd St., New York 21, New York 1952
Hutchinson, Arthur E[mlen], 2640 Glendessary Lane, Santa Barbara, California 1940
Hutchinson, Elverta G[raves], 1313 David Rd., Loveland, Ohio 1951
Hutt, Capt. Maurice B[ateman], 16 Block A, Garrison, St. Michael, Barbados, British West Indies 1957
L Huyler, Coulter D[unham], Dewees Island via Charleston, South Carolina 1928
Hyde, Dr. A. Sidney, Western State College of Colorado, Division of Natural Science and Mathematics, Gunnison, Colorado 1922
Ibarra, Jorge A., Museo Nacional de Historia Natural, Guatemala City, Guatemala, C. A. 1957
Imhof, Thomas A[nthony], 307 38 St., Fairfield, Alabama 1946
Ingle, Mrs. Gertrude [Mussell], Miller Place, Long Island, New York 1950
Ingles, Dr. Lloyd Glenn, Fresno State College, Fresno, California ... 1947
Irving, Mrs. William Gary, Van Houten Fields, West Nyack, New York 1947
Isaac, Donald E., Department of Zoology, University of California, Berkeley 4, California 1954

Isely, Mrs. Ruth Dillon, 2301 Shoal Creek, Austin 21, Texas 1956
Isleib, Peter Malcolm, R. D. 2, East Hampton, Connecticut 1957
Ivor, [Hance] Roy, R. R. 1, Erindale, Ontario, Canada 1947
Jacisin, Robert Joseph, 1331 Beverly Rd., Port Vue, McKeesport, Pennsylvania 1955
Jackson, Prof. C[icero] F[loyd], Department of Zoology, University of New Hampshire, Durham, New Hampshire 1936
HL Jackson, Dr. Hartley H[arrard] T[hompson], Room 61, U. S. National Museum, Washington 25, D. C. 1910
Jackson, William Bruce, Department of Biology, Bowling Green State University, Bowling Green, Ohio 1951
Jacobson, Dr. Malcolm Arthur, 13 W. 36th St., New York 19, New York 1947
Jahn, Frances Floed [Mrs. Theodore], 10241 Chrysanthemum Lane, Los Angeles 24, California 1947
James, Elden, Okanagan Academy, Rutland, British Columbia, Canada 1957
James, Frances [Crews], [Mrs. Douglas], Department of Zoology, University of Arkansas, Fayetteville, Arkansas 1953
James, William Stuart, P. O. Box 302, Chatham, Virginia 1953
Janssen, Robert B., 1817 W. 59th St., Minneapolis 19, Minnesota 1949
Janvrin, Dr. E[dmund] R[andolph] P[easlee], 38 East 85th St., New York 28, New York 1919
Jaquith, Barbara E[lizabeth] [Mrs. L. Everett], Terra Cotta, Ontario, Canada 1940
EM Jaques, F[rancis] L[ee], 10 E. Oaks Rd., North Oaks Farm, St. Paul 13, Minnesota ..... (1924) 1934
Jehl, Joseph R[eiher], Jr., 385 Grove St., Clifton, New Jersey 1952
Jenkins, James H[obart], School of Forestry, University of Georgia, Athens, Georgia 1941
Jenkins, Lloyd [Smith], Davis Hill Rd., Paxton, Massachusetts 1932
Jenks, Randolph, 2146 E. 4th St., Tucson, Arizona 1928
Jennings, Mrs. B. Brewster, Box 666 Glen Head, Long Island, New York 1957
Jennings, William S[elden], 1406 Crestwood Rd., Austin, Texas 1949
Jensen, Karl F., 9 "D" Street, Niagara Falls, New York 1957
L Jeter, Horace Hearne, 3205½ Fairfield Avenue, Shreveport 55, Louisiana 1946
Johnsgard, Paul A., Department of Conservation, Cornell University, Ithaca, New York 1957
L Johnson, Charles Alfred, c/o Colorado Museum of Natural History, Denver, Colorado 1927
Johnson, Daniel P[aige], Cape Cod Council, Inc., 147 Winter St., Hyannis, Massachusetts 1951
Johnson, Harris E[lmer], 440 Jackson Ave. Ext., Warren, Pennsylvania 1949
Johnson, Herbert, Box 202, Howard Beach Station, Jamaica 14, New York 1956
Johnson, John, Homespun Acres, R. F. D. 2, North Bennington, Vermont 1956
Johnson, John C[hristopher], Jr., Biology Department, Kansas State Teachers College, Pittsburg, Kansas 1953
Johnson, John O., 112 Seventh St., S. E., Watertown, South Dakota .. 1952

Johnson, Ned Keith, Museum of Vertebrate Zoology, Berkeley 4, California 1951
Johnson, Oscar Walter, 122 Audubon Way, Pullman, Washington .. 1957
Johnson, Perry F[rank], 670 Bell Ave., Elyria, Ohio 1937
Johnson, Raymond Edgar, Lands and Surveys Department, Port of Spain, 16 Abion Road, Trinidad, British West Indies 1945
Johnson, Raymond Roy, Rt. 2, Box 269, Glendale, Arizona 1955
EM Johnson, Dr. R[obert] A[nthony], R. D. 2, Gosport, Indiana .. (1930) 1946
Johnston, Allen G., 2356 Park Ave., Apt. 18, Cincinnati 6, Ohio 1956
Johnston, Mrs. Bette J[ane], 191 North Rose St., Mt. Clemens, Michigan 1955
EM Johnston, Dr. David Ware, Department of Biology, Mercer University, Macon, Georgia 1957
Johnston, Irma K., Box 206, Huntington, New York 1949
Johnston, Dr. Richard F[ourness], Museum of Natural History, University of Kansas, Lawrence, Kansas 1951
L Jones, Duvall A[lbert], 8227 Philadelphia Rd., Baltimore 6, Maryland 1952
Jones, Mrs. Ethel D., 859 Linden Ave., Shreveport, Louisiana 1954
Jones, Dr. Harold Charles, 2160 Stewart Ave. S. W., Atlanta 15, Georgia 1946
Jones, John C[ourts], 5810 Namakagan Rd., Washington 16, D. C. 1930
Jones, S[olomon] Paul, 509 West Ave., North, Waukesha, Wisconsin 1920
Jones, Warren, 14511 SE 42nd Place, Bellevue, Washington 1957
L Joost, Dr. Arthur Martin, Jr., Bucksport, Maine 1942
Jopson, Dr. Harry G[orgas] M[ichener], Bridgewater College, Bridgewater, Virginia 1949
Jorae, Irene F., Central Michigan College of Education, Mt. Pleasant, Michigan 1947
Joslyn, Joy E., 1306 Hayes Ave., Racine, Wisconsin 1955
Joyner, J[ohn] W[illiam] E[dwin], 1504 Lindy Ave., Rocky Mount, North Carolina 1947
Jubon, John M[athew], P. O. Box 16, East Millstone, New Jersey 1952
Judd, Robert S., 75 Old Farm Rd., Hamden 14, Connecticut 1948
Jung, Clarence S[chram], 6383 N. Port Washington Rd., Milwaukee 17, Wisconsin 1921
Jurica, Rev. Edmund, St. Procopius College, Lisle, Illinois 1946
Kahl, [Marvin] Philip, Jr., 122 E. 47th St., Indianapolis, Indiana 1952
Kaiman, Bernard D[avid], 529 S. Fulton St., Salisbury, North Carolina 1950
Kale, Herbert William, II, 31 N. Lenape Ave., Trenton 8, New Jersey 1956
F Kalmbach, E[dwin] R[ichard], 1601 Mariposa St., Boulder, Colorado ..... (1910) 1927
Kasper, John L[oren], 1344 Morrison St., Madison, Wisconsin 1948
Kassoy, Irving, 235 S. 4th St., Columbus, Ohio 1954
Keating, Dr. F[rancis] Raymond, Jr., 620 Tenth Ave., S. W., Rochester, Minnesota 1941
Keeler, James E., 3576 Georgetown Dr., Montgomery, Alabama 1952
Keeler, William S., 2032 Wellesley St., Palo Alto, California 1957
Keenan, Bennett R., 251 First St., Melrose 76, Massachusetts 1955
Keeton, Luther F., 80 Eastland Dr., Memphis, Tennessee 1945
Keil, Julius J., 3554 DeKalb Ave., New York 67, New York 1957
Keith, Lloyd Burrows, 424 University Farm Pl., Madison 5, Wisconsin 1956

Keller, Richard T., 2241 Nelson Dr., Schenectady 9, New York 1947
Kelley, Neil T[homas], 3681 Forest Hill Dr., Birmingham, Michigan 1951
Kellogg, Juliet Richardson [Mrs. Waters], 59 Phillips Street, Andover, Massachusetts 1937
EM Kellogg, Dr. [Peter] Paul, 115 Dearborn Place, Ithaca, New York (1929) 1939
Kelly, Alfred W[illiam] B[uchanan], 2177 Lincoln Ave., Apt. 12A, Montreal 25, P. Que., Canada 1951
LEM Kelly, Junea W[angeman] [Mrs. George Earle], 1311 Grand St., Alameda, California ..... (1929) 1949
Kemnitzer, Allen E[dward], 969 Five Mile Line Rd., Webster, New York 1949
Kemper, Dr. Charles A., 733 Maple St., Winnetka, Illinois 1954
Kemsies, Emerson, Department of Zoology, University of Cincinnati, Cincinnati 21, Ohio 1949
Kenaga, Eugene E., 1629 Isabella Rd., Midland, Michigan 1949
LF Kendeigh, Dr. S. Charles, Zoology Department, Vivarium Bldg., University of Illinois, Champaign, Illinois ..... (1923) 1943
Kendig, Dr. Perry F[ridy], 114 College Ave., North, Salem, Virginia 1954
Kennard, Dr. John H[arold], Box 150 R. F. D. 2, Manchester, New Hampshire 1957
Kennedy, Bruce H[amilton], 389 West 10th Ave., Columbus 1, Ohio 1954
Kent, Frederick W., University of Iowa, Iowa City, Iowa 1957
Kent, Lawrence C., 1896 Cowden Ave., Memphis 4, Tennessee 1946
Kenyon, G[eorge] Paul, R. D. 2, Coudersport, Pennsylvania 1952
Kenyon, James A[nthony], 417 Third Ave., Lewiston, Idaho 1946
Kenyon, Karl Walton, 11915 Lakeside Place N. E., Seattle 55, Washington 1944
Kersting, Cecil C[arl], Field Research Laboratory, Magnolia Petroleum Co., P. O. Box 900, Dallas 21, Texas 1949
Kesner, Robert T[aylor], 1 River Glen, Hastings-on-Hudson, New York 1952
LEM Kessel, Dr. Brina, Department of Biological Science, University of Alaska, College, Alaska ..... (1948) 1954
L Kieran, John, 25 Northwood Ave., Rockport, Massachusetts 1947
Kildow, T[homas] Monroe, Box 910, Tiffin, Ohio 1942
Kilham, Dr. Lawrence, 7815 Aberdeen Rd., Bethesda, 14, Maryland .. 1952
Killpack, Merlin L[eo], Union High School, Roosevelt, Utah 1949
Kimball, Miss Mary B[oydston], 809 Main St., Sisterville, West Virginia 1952
Kincaid, Edgar B[ryan], Jr., 702 Park Pl., Austin 5, Texas 1953
Kinch, Miss Carol M., 906 N. Grant St., Lexington, Nebraska 1952
King, James R[oger], Department of Experimental Biology, University of Utah, Salt Lake City 12, Utah 1952
King, Joseph E., P. O. Box 3830, Honolulu, Territory of Hawaii 1957
Kingsbury, Dr. Marguerite, Summount, New York 1950
Kinney, Mrs. Warren, P. O. Box 8, New Vernon, New Jersey 1951
Kinsey, Eric Campbell, Garnett Young and Co., 390 Fourth St., San Francisco, California 1956
Kinsley, C[harles] H[arwood], Rm. 1, Agriculture Bldg., Embarcadero at Mission St., San Francisco 5, California 1949

Kirby, Robert P[hilip], 2282 Yorkshire Dr., Decatur, Illinois 1956
Kirk, Harvey Charles, 615 North Wolfe St., Baltimore 5, Maryland .. 1957
Kirk, Lester King, 19520 Bretton Dr., Detroit 23, Michigan 1954
Kirk, Peter James, 412 Archer St., Freeport, New York 1956
L Kirkham, Stanton D[avis], 152 Howell St., Canandaigua, New York 1910
Kissam, Edward Bernard, Apt. D-7, 1902 Queen St., Winston-Salem, North Carolina 1954
Kitchen, Herman W., 423 W. 118th St., New York 27, New York 1952
Klabunde, Walter, Creek Rd. Ext., R. F. D. 1, Lewiston, New York 1949
Kleber, Richard T[homas], 37 Eames St., North Reading, Massachusetts 1955
Kleen, Richard L., Church Neck Road, St. Michaels, Maryland 1953
Klepfer, M. Ward, 169 Morris Ave., Buffalo 14, New York 1940
Klonick, Allan S., 111 Rowland Pkwy., Rochester 10, New York 1938
Klopfer, Peter, c/o L. M. Smith, 639 So. June St., Los Angeles 5, California 1957
Knapp, W[ilfrid] A[rthur], Box 727, Rosemere, Quebec, Canada 1950
Knickmeyer, Robert R., 8627 North Ave., St. Louis 21, Missouri 1946
Knight, Mrs. T. Spencer, 422 East Ave., Newark, New York 1956
Knoblaugh, Mrs. W. C., Rt. 3, Box 271, Tiffin, Ohio 1957
Knox, Miss Margaret R[ichardson], 4030 Park Ave., Indianapolis 5, Indiana 1941
Knorr, Capt. Owen A[lbert], 1918 Mariposa St., Boulder, Colorado 1949
Knowlton, Frederick Frank, 526 Stewart Ave., Ithaca, New York 1957
Knudsen, Holger, 1 Kentucky Ave., Toronto 9, Ontario 1953
Kobayashi, Keisuke, No. 2, 1-Chome, Shinohara-Kitamachi, Nada-Ku, Kobe (Rokko), Japan 1951
EM Koford, Dr. Carl B., Museum of Vertebrate Zoology, University of California, Berkeley 4, California ..... (1942) 1953
Kolb, C[harles] Haven, 5915 Meadow Rd., Baltimore 6, Maryland 1937
Kortheuer, H[ermann] Francis, R. R. 2, Falls Village, Connecticut 1950
LEM Kortright, Francis Herbert, 633 Eastern Ave., Toronto, Ontario, Canada ..... (1942) 1945
Kossack, Charles W., 715 S. Division St., Barrington, Illinois 1946
Kozicky, Dr. Edward L[ouis], Department of Conservation, Olin-Mathieson Chemical Corporation, East Alton, Illinois 1947
Kramer, Quintin, 872 Ledger Bldg., Philadelphia 6, Pennsylvania ... 1946
Kraus, Dr. Douglas L[awrence], Department of Chemistry, University of Rhode Island, Kingston, Rhode Island 1940
Krause, Herbert, 1811 First Avenue South, Sioux Falls, South Dakota 1955
Krebs, R[obert] W[illiam], 98 Druid Hill Rd., Summit, New Jersey 1952
Krehbiel, A[dolf] J[acob], 221 Jefferson St., Clayton, New Mexico 1949
L Krivanek, Robin Cooley, [Mrs. J. O.], Department of Zoology, Newcomb College, Tulane University, New Orleans, Louisiana 1952
Krug, Howard H[enry], Chesley, Ontario, Canada 1932
Krumm, Kenneth, Lacreek National Wildlife Refuge, Martin, South Dakota 1938
EM Kubichek, Wesley Frank, Fish and Wildlife Service, Department of the Interior, Washington 25, D. C. ..... (1919) 1939
Kuhlman, Franklin R[obert], 100 Margaret St., Lake Mills, Wisconsin 1954

Kunkle, Donald [Edward], Box 121, Port Norris, New Jersey 1950
Kuschke, Arthur Wyndham, Jr., 522 Kingston Rd., Oreland, Pennsylvania 1935
Kyllingstad, Henry C[arrel], Linton, North Dakota 1947
LaBelle, George A., Cocagne, New Brunswick, Canada 1939
Labisky, Ronald F., Section of Wildlife Research, Illinois Natural History Survey, Urbana, Illinois 1955
LaFave, Lynn D., 1311 Longfellow, Spokane 22, Washington 1956
EM Laing, Hamilton Mack, Comox P. O., British Columbia, Canada (1917) 1941
EM Lamb, Chester C., 412 Peach St., Compton, California ..... (1943) 1954
Lamm, Donald W., 3320 Reservoir Rd., Washington, D. C. 1941
Lamm, Harold G., Cleveland Zoological Park, Cleveland 9, Ohio ... 1956
Lancaster, Douglas A[lan], Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana 1949
Lanceley, W. H., 23 Elmdale Ave., Ottawa 2, Ontario, Canada 1926
Land, Hugh Colman, Zoology Department, Oklahoma University, Norman, Oklahoma 1953
Landing, James Edward, 510 E. 11th St., Michigan City, Indiana 1956
Langelier, Mrs. Gus[tave] [Adolphe], 1445 de l'Entente Blvd., Quebec, Canada 1940
Langford, Dr. Arthur N., Bishop's University, Lennoxville, Quebec, Canada 1952
Langstroth, James H[eidel], Box 1130, Silver City, New Mexico 1924
Lanning, Robert George, P. O. Box 9, Belleville, Ontario, Canada .. 1942
Lanyon, Dr. Wesley E., American Museum of Natural History, New York 25, New York 1947
Lapham, Virgil Texas, P. O. Box 233, Denham Springs, Louisiana 1946
Larkin, Frank L., The Putnam Trust Company, Greenwich, Connecticut 1957
Larkin, Harry Hubbard, 189 Van Rensselaer St., Buffalo 10, New York 1949
Larrabee, William M., 255–37 Upland Rd., Great Neck, New York 1955
Larrison, Dr. Earl J[unior], Department of Biological Sciences, University of Idaho, Moscow, Idaho 1946
Larson, Mervin W[alden], Arizona-Sonora Desert Museum, P. O. Box 5602, Tuscon, Arizona 1954
LEM Laskey, Amelia R. [Mrs. F. C.], 1521 Graybar Lane, Nashville, Tennessee ..... (1933) 1951
Latham, Roy, Orient, Long Island, New York 1916
Latta, Katharine, 430 W. Moreland Ave., Philadelphia 18, Pennsylvania 1949
Laun, Harry Charles, 1212 Hazel Dr., Alton, Illinois 1956
Laux, Louis J., Jr., 1120 Martin Place, Ann Arbor, Michigan 1955
Lawrence, Dr. John M., 2203 Orchard Dr., Pullman, Washington 1952
EM Lawrence, Mrs. Louise de Kiriline, Rutherglen, Ontario, Canada (1946) 1954
Lawson, Ralph, 5 Carpenter St., Salem, Massachusetts 1917
Lawson, W. J., Men's Residence, University of Natal, Oribi, Pietermaritzburg, South Africa 1955
Lazear, Dr. Davies, 545 Lincoln Ave., Winnetka, Illinois 1956
Lea, Dr. Robert B[ashford], 165 N. Liberty St., Elgin, Illinois 1941
L Learing, George Richmond, 168 Beacon St., Boston, Massachusetts 1924

Leavitt, Dr. Benjamin B., Department of Biology, University of Florida, Gainesville, Florida 1947
Leaycraft, Mrs. Edgar C. [Helen B.], Hills Point Rd., Westport, Connecticut 1950
Leberman, Robert C., R. D. 1, Saeger Hill, Meadville, Pennsylvania 1956
Lee, George R[eynolds], River Basin Studies, Fish and Wildlife Service, Washington 25, D. C. 1949
Leedy, Dr. Daniel L[oney], Fish and Wildlife Service, Department of the Interior, Washington 25, D. C. 1937
L Lees-Smith, D[erek] T[hayer], Broadmoor Hospital, Crowthorne, Berkshire, England 1951
LeFebvre, Eugene Allen, 2301 E. Co. Rd. E., White Bear 10, Minnesota 1953
LeFevre, Rufus H[arry], 54 N. Lehman St., York, Pennsylvania 1927
Legg, Mrs. Dorothy C[ogan], 1823 Irving Ave., S., Minneapolis 5, Minnesota 1950
Leister, Dr. Claude W[illard], Pocono Wild Animal Farm, R. R. 1, Stroudsburg, Pennsylvania 1916
Lemaire, Robert J[oseph], 1445 15th Ave., Vero Beach, Florida 1954
Lemieux, Louis, 1208 Albert Lozeau, Quebec 6, P. Q., Canada 1949
Lemmon, Robert S[tell], Olmstead Hill, Wilton, Connecticut 1950
Lengemann, Martha A., 360 Cedar St., Imlay City, Michigan 1949
Lenhert, P[aul] Galen, Department of Biophysics, Johns Hopkins University, Baltimore 18, Maryland 1952
Lenz, Lawrence R., 10725 Borgman Ave., Huntington Woods, Michigan 1954
EM Leopold, Dr. A[ldo] Starker, Museum of Vertebrate Zoology, Berkeley 4, California ..... (1940) 1946
Leupold, Norbert H., 3555 S. E. Insley, Portland 2, Oregon 1946
Levi, Dr. Herbert W., Museum of Comparative Zoology, Harvard University, Cambridge 38, Massachusetts 1952
L Levy, Seymour Harry, R. R. 9, Box 960, Tucson, Arizona 1956
Lewis, Alice Hay [Mrs. Neil H.], 2220 N. Berendo St., Los Angeles 27, California 1952
Lewis, C. Bernard, Science Museum, Institute of Jamaica, Kingston, Jamaica, British West Indies 1947
LF Lewis, Dr. Harrison F., West Middle Sable, Shelburne County, Nova Scotia, Canada ..... (1912) 1942
Lewis, Joseph S., 86 S. Main St., Box 441, Spring Grove, Pennsylvania 1953
Lewis, Miss Mary Genevieve, Warren Wilson College, Swannanoa, North Carolina 1954
Lewis, William O[wen], Ivy, Virginia 1951
Lidicker, William Z[ander], Jr., Museum of Vertebrate Zoology, University of California, Berkeley 4, California 1950
Liebe, Harold J[ohn], 166 Ballard Dr., Hartford 7, Connecticut 1943
Lieftinck, John E[dmund], c/o Goodyear S. A., Luxembourg City, Luxembourg 1949
Lien, Boyd M[arten], 5148–29 Ave., S., Minneapolis 17, Minnesota .. 1951
L Ligas, Frank J[ohn], 1500 S. W. 15th Ave., Ft. Lauderdale, Florida 1951
Lightman, Nason S[halom], 174 West Woodruff Ave., Columbus 1, Ohio 1957
EM Ligon, J[ames] Stokley, Box 950, Carlsbad, New Mexico .... (1912) 1927

LF Lincoln, Dr. Frederick C., Fish and Wildlife Service, Department of the Interior, Washington 25, D. C. ..... (1910) 1934
Lindau, S. Paul, 108 N. Harvard Blvd., Los Angeles 4, California 1954
Lindsay, Bert Wetzel, 4520 Highland Terrace, Austin 3, Texas 1956
Linford, James B., 538 Fairbanks Ave., Oakland 10, California 1952
F Linsdale, Dr. Jean M., Jamesburg Route, Carmel Valley, California ..... (1922) 1945
Linsner, Norman Dale, 915 Fourth St., Three Rivers, Michigan 1956
Linton, M[orris] Albert, 315 E. Oak Ave., Moorestown, New Jersey .. 1928
Lippert, George E[dward], Brown Road, R. D. 1, Albion, New York 1956
Littahorsky, Anton, 3808 Union Rd., (Afton), St. Louis 23, Missouri 1954
Livermore, John Walton, Old Merchant Rd., West Redding, Connecticut 1947
Livingston, Philip Atlee, 620 Manor Rd., Narberth, Pennsylvania ... 1956
Lloyd, Clark K[orner], 11 N. Elm St., Oxford, Ohio 1949
LF Lloyd, Hoyes, 582 Mariposa Ave., Ottawa, Ontario, Canada .... (1916) 1932
Lloyd, Mrs. Wilmot, 582 Mariposa Ave., Ottawa, Ontario, Canada .. 1925
L Lockwood, Dr. Robert Minturn, 2217 Glenwood Lane, Denton, Texas 1947
Loetscher, Dr. Frederick Wm., Jr., 507 W. Main St., Danville, Kentucky 1938
Loftin, Mrs. H. Grady, 1942 West Ashby Pl., San Antonio 1, Texas ... 1956
Long, Betty Holmes [Mrs. Harry], Green Brier Rd., R. F. D. 6, Westport, Connecticut 1949
Long, Mrs. Roberta J., 45 Clarendon Ave., San Francisco 14, California 1952
Longley, William H[oward], P. O. Box 362, Kasson, Minnesota 1943
EM Longstreet, Rubert James, Rt. 2, Box 177, DeLand, Florida .... (1923) 1949
Longwell, John Raymond, Box 8, Solomons, Maryland 1955
Loomis, Mrs. Hazel Ellis, [Prof.], R. D. 2, Box 157 T, Hammond, Louisiana 1935
Løppenthin, Bernt, University Library, Dansk Ornithologisk, Forening 2 Dept.-Nr. Alle 49, Copenhagen, Denmark 1928
Lord, Dr. Frederic P[omeroy], 960 Broadway, Dunedin, Florida 1922
Loring, George G[ardiner] Bridge St., Manchester, Massachusetts .. 1949
Loukashkin, A. S., 1210 23rd Ave., San Francisco, California 1941
Lovell, Mrs. C. Edwin, 61 Norwick Dr., Youngstown 4, Ohio 1957
Lovell, Dr. Harvey B[ulfinch], 2346 Dundee Rd., Louisville 5, Kentucky 1943
Lovett, Mrs. Robert A., "Pleasance," Locust Valley, Long Island, New York 1953
LEM Low, Seth H[askell], Rt. 2, Gaithersburg, Maryland ..... (1930) 1949
Lowe, Miss Mildred Eileen, Box 218, Louisiana College, Pineville, Louisiana 1956
F Lowery, Dr. George H[ines], Jr., Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana ..... (1934) 1949
L Lownes, Albert E., P. O. Box 1531, Providence, Rhode Island 1924
Lowther, James K., 1375 Sherwood Crescent, Apt. 206, Montreal 16, Quebec, Canada 1956
Ludwig, Charles, Crawford County Institute, Saegerstown, Pennsylvania 1949
Ludwig, Dr. F[rederick] E[dwin], 2864 Military St., Port Huron, Michigan 1949

Ludwig, John Paul, P. O. 445, Dan's Highway, New Canaan, Connecticut 1955
Lueshen, Mrs. John, Wisner, Nebraska 1952
Lukens, William Weaver, Jr., Upper Gulph Rd., Radnor, Pennsylvania 1946
Lumsden, H. G., Southern Research Station, Maple, Ontario, Canada 1951
Lundberg, Arnold Edward, R. F. D. 1, Walnut Hill, Thomaston, Connecticut 1954
Lunk, Dr. William A., 1807 Sunrise St., Ann Arbor, Michigan 1938
Lupient, Mrs. Mary Louise, 212 S. E. Bedford St., Minneapolis, Minnesota 1946
Luthy, Ferd[inand], Jr., 1310 N. Institute, Peoria, Illinois 1937
Luwe, William Ralph, 309 State St., Mankato, Minnesota 1954
Lynn, Robert, Biology Department, Austin College, Sherman, Texas 1957
Maag, Miss Mathilda M., 18714 Kinsman Rd., Shaker Heights 22, Ohio 1956
MacCracken, Mrs. Helen Dolman, Box 1115, Estes Park, Colorado .. 1931
MacDonald, Duncan, 1201 California Dr., Apt. 203, St. Paul 13, Minnesota 1955
Mack, H. G., c/o Gilson Manufacturing Company, Guelph, Ontario, Canada 1933
Mackay, R[onald] H[ugh], Forestry and Geology Bldg., University of British Columbia, Vancouver, British Columbia, Canada 1950
Mackenzie, Dr. Locke L., 829 Park Ave., New York 21, New York 1946
Mackiewicz, John Stanley, Comstock Hall, Cornell University, Ithaca, New York 1952
Mackinnon, Joseph Ayer, 2047 9th Ave., Greeley, Colorado 1957
Macklin, Paul R., Bryant, Indiana 1954
Mackworth-Praed, C[yril] W[inthrop], Castletop, Burley, near Ringwood, Hants., England 1928
Maclay, Mark W[alton], 76 Beaver St., New York, New York 1905
Maclean, Dorothy W[illiams], 58 Newtown Ave., Norwalk, Connecticut 1931
MacLulich, Dr. Duncan A[lexander], 342 Marshall Court, Ottawa, Ontario, Canada 1931
Macpherson, Andrew H[all], 535 Percy St., Ottawa, Ontario, Canada 1951
Madison, Samuel R., 14 McGuffey Lane, Delmar, New York 1952
Magner, J[ohn] Marshall, 516 Bacon Ave., Webster Groves 19, Missouri 1948
Magney, Gertrude Blackwell [Mrs. G. R.], 5329 Washburn Ave., S., Minneapolis 10, Minnesota 1950
Maher, William Joseph, Museum of Vertebrate Zoology, University of California, Berkeley 4, California 1953
Mainster, Raymond Waite, 3716 Croydon Rd., Baltimore 7, Maryland 1953
Mair, W[illiam] Winston, 271 Pleasant Park Rd., Ottawa 1, Ontario, Canada 1953
Mall, Rolf E[mil], 753 Johnson St., Red Bluff, California 1952
Malott, James P[reston], 4911 Eppes, Houston 21, Texas 1956
Mangels, Frederick P[aul], 708 Farmers Ave., Bellmore, Long Island, New York 1953

Manners, Edward R[obert], 216 New Broadway, Brooklawn, New Jersey 1941
EM Manning, Thomas H[enry], 37 Linden Terrace, Ottawa, Ontario, Canada ..... (1937) 1949
Mannix, Mrs. Lucille, 3899 East 176 St., Cleveland 28, Ohio 1947
Marble, Richard M[errill], Woodstock, Vermont 1907
Margolin, A[braham] S[tanley], Phoenix College, Biology Department, Phoenix, Arizona 1949
Marionneaux, Alice S[tuntz] [Mrs. Belfort V.], Central Romana Corp., La Romana, Dominican Republic 1941
L Mark, Cyrus, 270 Birch St., Winnetka, Illinois 1952
Marsden, Halsey Means, 75 Westland Ave., West Hartford 7, Connecticut 1956
Marsh, Thompson G., College of Law, 1445 Cleveland Place, University of Denver, Denver, Colorado 1957
Marshall, David B., Malheur National Wildlife Refuge, Burns, Oregon 1942
EM Marshall, Dr. Joe T., Jr., Department of Zoology, University of Arizona, Tucson, Arizona ..... (1941) 1948
Marshall, Perry R[aymond] F[oster], Denman Island, British Columbia, Canada 1952
Marshall, Terrell, 372 Skyline Dr., Park Hill, North Little Rock, Arkansas 1944
EM Marshall, Dr. William Hampton, 300 Coffey Hall, University of Minnesota, St. Paul 1, Minnesota ..... (1935) 1950
Martin del Campo, Rafael, Instituto de Biologia, Ciudad Universitaria, Mexico D.F., Mexico 1948
Martin, Dr. Donald B[eckwith], Metabolic Unit, Peter Bent Brigham Hospital, 721 Huntington Ave., Boston 15, Massachusetts 1954
Martin, Fant W., 1078 Crescent Drive, Logan, Utah 1957
Martin, Frank R., Foxholm, North Dakota 1953
Martin, H. Bradley, 465 East 57th St., New York 22, New York 1955
Martin, Patrick Waldyve, R. R. 2, Kamloops, British Columbia, Canada 1948
Martola, H. R., Ulkoasiainministerio, Helsinki, Finland 1953
Marvel, Dr. Carl S[hipp], 404 W. Pennsylvania Ave., Urbana, Illinois 1951
EM Maslowski, Karl H[erbert], 1034 Maycliff Place, Cincinnati, Ohio (1935) 1951
Mason, C[harles] N[athan], 6432 31st St., N. W., Washington 15, D. C. 1948
EM Mason, C[harles] Russell, 1376 Walnut St., Newton Highlands 61, Massachusetts ..... (1936) 1947
Mason, Edwin A., Arcadia Wildlife Sanctuary, Easthampton, Massachusetts 1943
Mason, Robert F[rench], Jr., Rt. 1, Apopka, Florida 1929
Mather, Richard H., 5583 Queen Mary Rd., Hampstead 29, Montreal, Quebec, Canada 1947
Mathews, Dr. Frank P[elletreau], Rt. 6, Box 308, Olympia, Washington 1923
L Mathieu, J. A., Rainy Lake, Ontario, Canada 1952
Matousek, Frank, Halenarska 11, Trnava, Czechoslovakia 1953

Matthews, William Henry, Jr., 2 Berkeley Ave., Apt. 2F, Yonkers 5, New York 1948
Mattocks, James [Richardson], Professional Building, High Point, North Carolina 1949
May, Fred H[amilton], 211 Beall St., Lenoir, North Carolina 1952
Mayfield, Al Heath, P. O. Box 685, Lexington, Kentucky 1954
LEM Mayfield, Harold F[ord], River Road, Waterville, R. F. D., Ohio (1940) 1950
Mayhew, Dr. Wilbur W[aldo], Division of Life Sciences, University of California, Riverside, California 1947
LF Mayr, Dr. Ernst, Museum of Comparative Zoology, Harvard University, Cambridge 38, Massachusetts ..... (1929) 1937
L Mazzeo, Rosario, 114 The Fenway, Boston, Massachusetts 1943
FE McAtee, Waldo Lee, 3 Davie Circle, Chapel Hill, North Carolina (1903) 1913
EM McCabe, Dr. Robert A., 424 University Farm Place, Madison 5, Wisconsin ..... (1946) 1951
McChesney, Donald Stevenson, 405 Piercefield Dr., (Solvay), Syracuse 9, New York 1955
McChesney, Marian Pennock [Mrs. Donald S.], 405 Piercefield Dr., (Solvay), Syracuse 9, New York 1955
McClung, Robert M[arshall], Adelphi Ave., Harrison, New York ... 1949
McClure, Dr. H[owe] Elliott, 406 Med. Gen. Lab., A.P.O. 343, San Francisco, California 1942
McCollough, Alice Lois, 424 Judson St., Marion, Alabama 1957
McConoughey, Frank P[erry], 1547 Northland Ave., Lakewood 7, Ohio 1953
HL McCook, Philip James, 25 East End Ave., New York 22, New York .. 1895
McCormick-Goodhart, L[eander], "Bellapais," 610 E. Boulevard Dr., Alexandria, Virginia 1927
McCoy, Edward Gordon, Rt. 2, Snow Hill, North Carolina 1956
McCoy, John J., Tennessee Wesleyan College, Athens, Tennessee ... 1956
McCue, Dr. Earl N[ewlon], P. O. Box 104, Morgantown, West Virginia 1949
McCullagh, Dr. E. Perry, Cleveland Clinic, 2020 E. 93rd St., Cleveland 6, Ohio 1954
McDade, Dr. Harry C., P. O. Box 678, Hanover, New Hampshire ... 1957
McDonald, Dr. George V., Apple Hill, Ontario, Canada 1952
McElroy, Thomas P., Jr., The Pequot-sepos Wildlife Sanctuary, Pequot-sepos Ave., Mystic, Connecticut 1947
McEntee, Elinor G., [Mrs. Howard G.], 490 Fairfield Ave., Ridgewood, New Jersey 1949
McGaw, Mrs. G. H[ampton] (Elizabeth T[aylor]), 18 Beech St., Woodsville, New Hampshire 1949
McGeen, Dr. Daniel S., 707 Community National Bank Bldg., Pontiac, Michigan 1945
McGowan, Terry A[llen], 499 Longview Drive, Lexington, Kentucky 1952
McIlvain, John F[olwell], 141 E. Maple Ave., Langhorne, Pennsylvania 1949
McIlwaine, Dr. William B[aird], Jr., "Sysonby," R. R. 4, Petersburg, Virginia 1933
McIlwraith, T[homas] F[orsyth], 30 Strathallan Blvd., Toronto 12, Ontario, Canada 1933

McKay, Neil, 38 S. Dearborn St., Rm. 1400, Chicago 3, Illinois 1955
McKay, Reg[inald] R., P. O. Box 8374, Arlington Branch, Jacksonville 11, Florida 1949
McKeever, Mrs. Katharine R[yan], P. O. Box 62, Water Mill, New York 1951
McKinley, Daniel Lawson, Bowdoin College, Biology Department, Brunswick, Maine 1952
McKinney, Dr. [David] Frank, Delta Waterfowl Research Station, Delta, Manitoba, Canada 1955
McKittrick, Thomas Harrington, Slate Falls, Blairstown, R. D. 2, New Jersey 1928
McKnight, Edwin T[hor], 5038 Park Place, Washington 16, D. C. .. 1947
McLaughlin, Charles Albert, Los Angeles County Museum, Exposition Park, Los Angeles 7, California 1957
McLaughlin, Frank Winnifred, Ewing Ave., Franklin Lakes, New Jersey 1947
L McLaughlin, Vincent P., Jr., 287 Poland Center Rd., Poland 14, Ohio 1938
McLean, Donald D[udley], 2455 Cottle Ave., San Jose 25, California 1930
McLeod, John A[llen], Jr., 113 E. Hendrix St., Greensboro, North Carolina 1950
McManus, Reid, Jr., Memramcook, New Brunswick, Canada 1930
McMillan, Eben, Cholame, California 1947
McMillan, Ian I[rving], Box 63, Shandon, California 1947
McMillan, William R[enton], 12701 12th Ave., N. W., Seattle 77, Washington 1938
McQuate, Dr. A. G., 374 Riverside Dr., Rt. 3, Tiffin, Ohio 1957
Meacham, Frank B., North Carolina State Museum, Raleigh, North Carolina 1947
Meade, Dr. Gordon M[ontgomery], 1427 Eye St., N. W., Washington, D. C. 1936
EM Meanley, M. Brooke, Patuxent Research Refuge, Laurel, Maryland (1935) 1952
Means, Robert Whitman, Topsfield, R. F. D., Massachusetts 1955
L Medcalf, Robert, 1824 S. W. 11th Ave., Portland 1, Oregon 1943
Medina, Don R[aul], Museum of Vertebrate Zoology, University of California, Berkeley 4, California 1955
Mehner, John F[rederick], 1526 Greenmont Ave., Pittsburgh 16, Pennsylvania 1948
Meitzen, Logan Herman, Box 66, Anahuac, Texas 1953
Meitzen, Dr. Travis C., Box 308, Refugio, Texas 1942
Mellinger, Enos Oren, Savannah N. W. Refuge, Box 4008, Port Wentworth, Georgia 1940
Menaboni, Athos, 1111 Cook Rd., N. W., Atlanta 5, Georgia 1947
F Mendall, Howard L[ewis], Maine Coop. Wildlife Res. Unit, 121 East Annex, University of Maine, Orono, Maine ..... (1934) 1954
Menefee, Emory, 5600 Paraquay St., El Paso, Texas 1950
L Meng, Dr. Heinz, 116 Miller St., Ithaca, New York 1944
EM Mengel, Robert M., Museum of Natural History, University of Kansas, Lawrence, Kansas ..... (1938) 1951
Menninger, Philip B[ratton], 1724 Collins Ave., Topeka, Kansas ... 1954

Merck, George Wall, "The Fields," Far Hills, New Jersey 1955
Meredith, Rex, 1045 Monckton Ave., Quebec, Canada 1927
Meritt, James K., 16 Ellen Lane, Scotia 2, New York 1942
Merkel, Robert S[ydney], 212 Sunset Ave., Charlottesville, Virginia 1953
Mers, William H., 1659 Marlowe Ave., Cincinnati 24, Ohio 1951
Metcalf, Homer N[oble], Department of Horticulture, Montana State College, Bozeman, Montana 1946
Mewaldt, Dr. L[eonard] Richard, Department of Natural Sciences, San Jose State College, San Jose, California 1947
L Meyer, Miss Heloise, Lenox, Massachusetts 1913
Meyer, Dr. Henry, 115 Graham Ave., Whitewater, Wisconsin 1944
Meyerdierks, Herman J., 34 Otsego St., Brooklyn 31, New York 1957
Meyerriecks, Andrew J[oseph], Biological Laboratories, Harvard University, Cambridge 38, Massachusetts 1948
L Meyers, Dr. Kenneth Lewis, 2222 Far Hills Ave., Dayton 9, Ohio 1953
Michaud, Ted Corneille, 4014 Maplewood, Austin, Texas 1955
Michener, Josephine R. [Mrs. Harold], 418 N. Hudson Ave., Pasadena 4, California 1950
Middleton, Mrs. Archie D., Brady, Nebraska 1952
Middleton, R[aymond] J[ones], 131 N. Whitehall Rd., Norristown, Pennsylvania 1920
Miles, Mrs. Burgess, 2134 Kendall Ave., Madison 5, Wisconsin 1956
Miles, M[erriam] L[ee], Chamber of Commerce, Box No. 1500, Greenville, South Carolina 1941
Millar, John Burton, Department of Zoology, University of Wisconsin, Madison, Wisconsin 1954
LF Miller, Dr. Alden Holmes, Museum of Vertebrate Zoology, University of California, Berkeley 4, California ..... (1929) 1939
Miller, Mrs. Clarence H[eath], 1354 Herschel Ave., Cincinnati 8, Ohio 1939
Miller, Clark, Inwood, West Virginia 1951
L Miller, Douglas Scott, 122 Lawrence Ave., East, Toronto, Ontario, Canada 1938
Miller, Mrs. Hettie, Murtle Lake Wells Gray Park, c/o B. C. Forestry Office, Kamloops, British Columbia, Canada 1957
Miller, Dr. John R., 366 N. Van Ness Ave., Fresno 1, California 1946
LF Miller, Dr. Loye H[olmes], Museum of Vertebrate Zoology, Berkeley 4, California ..... (1918) 1930
Miller, Lyle DeVern, 5795 Mill Creek Blvd., Youngstown 12, Ohio .. 1947
EM Miller, Dr. Robert C[unningham], California Academy of Sciences, San Francisco 18, California ..... (1935) 1942
Miller, Mrs. Wilmer J., [Lotus Simon], 529 E. 9th St., Davis, California 1955
Mills, Dudley H[olbrook], Glen Head, Long Island, New York 1929
Mills, Dr. Harlow B[urgess], Natural History Survey, Urbana, Illinois 1949
L Mills, Herbert Hagerman, Arrowhead Farms, Bridgeton R. D. 3, New Jersey 1955
Mills, W[illett] J[ames], 100 Spring Garden Rd., Halifax, Nova Scotia, Canada 1953
Millspaugh, Prof. D. D., Iowa Wesleyan College, Mt. Pleasant, Iowa 1957
Milnes, Herbert, 707 Hughson St., Woodstock, Ontario, Canada 1952
Minard, Elbridge A., 25 Maple St., Auburndale 66, Massachusetts .. 1954

Minich, Edward C[onrad], 1047 Fairview Ave., Youngstown 2, Ohio 1949
Minot, John Granville, 31 Benjamin Rd., Arlington, Massachusetts .. 1956
Miskimen, Miss Mildred, Department of Physiology, Miami University, Oxford, Ohio 1951
LEM Mitchell, Harold D[ies], 238 W. Royal Parkway, Williamsville 21, New York ..... (1930) 1949
L Mitchell, Mrs. Osborne S. [Margaret H.], 150 Balmoral Ave., Apt. 301, Toronto, Ontario, Canada 1928
HL Mitchell, Dr. Walton L[ungerich], 398 Vassar Ave., Berkeley 8, California 1893
Mohr, Charles Edward, Audubon Center, Quaker Ridge, Greenwich, Connecticut 1942
Monk, H[arry] C[rawford], 406 Avoca St., Nashville 5, Tennessee ... 1921
EM Monroe, Burt L[eavelle], Ridge Road, Anchorage, Kentucky .. (1935) 1947
L Monroe, Lt. JG. Burt L., Jr., USNR., c/o Francis M. Weston, 2006 E. Jordan St., Pensacola, Florida 1953
Monroe, Dr. James, Ray Brook, New York 1940
Monroe, Morgan C., 2802 North 21st St., Phoenix, Arizona 1954
EM Monson, Gale [Wendell], P. O. Box 1032, Yuma, Arizona .... (1937) 1950
Montgomery, George Hugh, 4689 Westmount Ave., Westmount, Quebec, Canada 1947
Moody, A[delbert] J[ohn], 794 Farmington Ave., West Hartford 7, Connecticut 1918
L Moody, Miss Olive B[eauchamp], 510 River Rd., Beaver, Pennsylvania 1949
Mook, Leonard Jan, 262 Jackson St., West, Hamilton, Ontario, Canada 1957
Moon, Jennie S[ennett], 4107 W. Woodbine St., Chevy Chase 15, Maryland 1949
Moon, Dr. Neil S[ennett], 25 Edgewater Lane, Zone 17, Rochester 9, New York 1949
L Moore, John Royal, 344 92nd St., Stone Harbor, New Jersey 1957
Moore, Dr. Joseph C[urtis], Department of Mammals, American Museum of Natural History, New York 24, New York 1952
Moore, Robert B[yron], 1332 Knollwood Dr., Baton Rouge, Louisiana 1949
LF Moore, Dr. Robert Thomas, Laboratory of Zoology, Occidental College, Los Angeles 41, California ..... (1898) 1940
Moore, Tilford, 2265 Carter Ave., St. Paul 8, Minnesota 1945
Morejohn, G[onzalo] Victor, Department of Zoology, University of California, Davis, California 1947
Moreno, Dr. Abelardo, Museo Poey, Catedra "U," Escuela de Ciencias, Universidad de la Habana, Habana, Cuba 1942
Morgan, Allen H., Cochituate Rd., Wayland, Massachusetts 1947
Morgan, Edmund, Tackapausha Preserve, Seaford, Long Island, New York 1956
L Morgan, John Sage, 38 Garrison Rd., Brookline, Massachusetts 1927
Morland, Thomas F[rancis] T[hornhill], 1 Ogilvie St., Halifax, Nova Scotia, Canada 1952
Morrison, Alva, 2 Garden Terrace, Cambridge 38, Massachusetts 1945
Morrison, Kenneth Douglas, Mountain Lake Sanctuary, Lake Wales, Florida 1947
Morrow, Mrs. John, Jr., (Dessie P[owers]), 1320 N. State St., Chicago 10, Illinois 1945

Morse, Douglass H[athaway], Star Route, Lisbon, Maine 1956
Morse, Miss Margarette E[lthea], 122 W. South St., Viroqua, Wisconsin 1919
Mortensen, Hemming, 9305 - 208 St., Queen's Village, New York ... 1953
Morton, Eugene S., 21247 Maplewood Ave., Rocky River 16, Ohio .. 1957
LEM Moser, Dr. R[euben] Allyn, 911 S. 89th St., Omaha 6, Nebraska (1940) 1947
L Moses, Dr. Leon, 19 East 74th St., New York 21, New York 1948
Moss, Miss Margaret Steel, "40 Acres," R. D. 1, Linglestown, Pennsylvania 1956
Mossman, Dr. Archie S[tanton], Department of Biology, University of Wisconsin, Extension, Green Bay, Wisconsin 1955
Mossop, Harold S[cott], 31 St. George's Road, St. Vital, Winnipeg 8, Manitoba, Canada 1957
Mostoller, Ralph V[ickroy], 1 Cleveland St., Johnstown, Pennsylvania 1936
Mott, Peter Rhoades, Middlesex School, Concord, Massachusetts ... 1957
Moulton, Francis S[evern], 14 Acorn St., Boston 8, Massachusetts .. 1926
Moulton, Francis Severn, Jr., 2 Elm St., Concord, Massachusetts 1947
Mountfort, Guy, Hartley House, Woldingham, Surrey, England 1953
Moyer, Jack T[homson], 11 Oaza Tsubota, Miyake Mura, Miyake Jima, Tokyo-to, Japan 1952
Moynihan, Dr. Martin H., Canal Zone Biological Area, Drawer C, Balboa, Panama, Canal Zone 1954
L Mudge, Edmund W., Jr., 5926 Averill Way, Dallas 5, Texas 1947
Mudge, Eugene TenBroeck, R. F. D., Northport, Long Island, New York 1953
Mueller, Helmuth, 2756 N. Palmer St., Milwaukee 12, Wisconsin .. 1948
Muggenburg, Bruce A., 1609 S. Hawthorne, Sioux Falls, South Dakota 1952
Muhlbach, W[alt] L[auritz], 2127 Ashby Ave., Berkeley 5, California 1954
Muir, A[llister], 1682 Marine, Park of Canada, West Vancouver, British Columbia, Canada 1955
Mulligan, Walter F., 9210 49th Ave., College Park, Maryland 1947
Mulloy, Elizabeth J. [Mrs. Milton S.], 4824 So. 29th St., Arlington 6, Virginia 1947
Mumford, Russell Eugene, Museum of Zoology, University of Michigan, Ann Arbor, Michigan 1954
EM Munro, David Aird, Canadian Wildlife Service, 150 Wellington St., Ottawa, Ontario, Canada ..... (1947) 1956
EM Munro, George C[ampbell], 3029 Hibiscus Dr., Honolulu 15, Hawaii (1939) 1945
F Munro, James Alexander, Okanagan Landing, British Columbia (1913) 1941
Munter, Rear Admiral W[illiam] H[enry], 4518 52nd Ave., N. E., Seattle 5, Washington 1927
Murdock, James [Ingram], 311 Irving Ave., Glendale 1, California .. 1943
Murdy, H[oratio] W[illiams], South Dakota Department of Game, Fish and Parks, Pierre, South Dakota 1949
EM Murie, Dr. O[laus] J[ohan], Moose, Wyoming ..... (1913) 1934
Murphy, Miss Alice Veronica, 305 Massasoit Rd., Worcester, Massachusetts 1957
Murphy, Grace E[meline] Barstow [Mrs. Robert C.], "Briarlea," Old Field, Setauket, New York 1919
Murphy, Joseph Robinson, 625 South 51st St., Lincoln 10, Nebraska .. 1952

F Murphy, Dr. Robert Cushman, "Briarlea," Old Field, Setauket, Long Island, New York ..... (1905) 1920
Murphy, Paul Charles, 935 Goodrich Ave., Apt. 10, St. Paul 5, Minnesota 1954
Murray, Bertram G[eorge], Jr., 807 Mountain Ave., Bound Brook, New Jersey 1956
Murray, Dougald, R. R. 1, Melbourne, Ontario, Canada 1952
EM Murray, Rev. J[oseph] J[ames], 6 White St., Lexington, Virginia (1928) 1936
Murray, Miss Lucy H., Regina College, Regina, Saskatchewan, Canada 1955
Musgrove, Jack W[arren], 2414 Adams St., Des Moines, Iowa 1946
Musselman, Dr. T[homas] E[dgar], 124 S. 24th St., Quincy, Illinois 1922
Myers, Buford M[acMartin], Jr., 2104 Gen. Pershing St., New Orleans 15, Louisiana 1952
Myres, Timothy Miles, Department of Zoology, University of British Columbia, Vancouver 8, British Columbia, Canada 1955
Naumburg, Walter W[ehle], 121 East 64th St., New York, New York 1923
Neal, Mrs. Charles, Box 133, Demorest, Georgia 1946
EM Neff, Johnson A[ndrew], Wildlife Research Laboratory, Building 45, Denver Federal Center, Denver 2, Colorado ..... (1919) 1951
Neher, Harry T[rainor], 817 Radcliffe St., Bristol, Pennsylvania 1951
Nelson, Mrs. Almer P. [Grace Sharritt], Jackson, Wyoming 1949
Nelson, Mrs. Charles E., Jr., Box 77 C - Route 1, Dousman, Wisconsin 1938
Nelson, Harvey K., Fish and Wildlife Service, P. O. Box 728, Saginaw, Michigan 1953
L Nelson, Dr. Theodora, 315 E. 68th St., New York 21, New York 1927
EM Nero, Dr. Robert W[illiam], Department of Natural Resources, Saskatchewan Museum of Natural History, Regina, Saskatchewan (1950) 1955
Nessle, James P[hilip], R. F. D. 1, Waterville, Ohio 1949
Netherton, Hazel I. M. [Mrs. Clifford L.], P. O. Herndon, Virginia, R. R. 2, Forestville, Fairfax Co., Virginia 1947
Neu, Dr. Harold N., 506 No. Elmwood Rd., Omaha 3, Nebraska 1952
New, Dr. John G., Science Department, State University Teachers College, Oneonta, New York 1946
Newberry, A[ndrew] Todd, 70 Rock Spring Rd., West Orange, New Jersey 1952
Newill, Dr. D. S., P. O. Box 634, Connellsville, Pennsylvania 1949
EM Newman, Robert J[ames], Zoology Department, Louisiana State University, Baton Rouge, Louisiana ..... (1943) 1952
LF Nice, Mrs. Margaret Morse, 5725 Harper Ave., Chicago 37, Illinois (1920) 1937
EM Nichols, Charles K[etcham], 212 Hamilton Rd., Ridgewood, New Jersey ..... (1931) 1948
Nichols, Mrs. Charles K., 212 Hamilton Rd., Ridgewood, New Jersey 1933
LEM Nichols, John Treadwell, American Museum of Natural History, 79th St. and Central Park West, New York 24, New York .... (1901) 1914
L Nicholson, Donald John, 1224 Palmer St., Orlando, Florida 1947
Nickell, Walter Prine, Cranbrook Institute of Science, Bloomfield Hills, Michigan 1941

EM Niedrach, Robert James, Box 116-A, R. R. 3, Littleton, Colorado (1940) 1944
Nielson, Beatrice Wise, (Rt. 1, Box 808, Nielsen Reservation), Kauffman Ave., Red Bluff, California 1949
Niosi, Nicholas, 65 Park Ave., Bloomfield, New Jersey 1953
Niper, Gail Broughton, [Mrs. Leonard C.], 99 Ridgewood Rd., Clifton, New Jersey 1949
Nolan, James R., 14 Edgewood Rd., Peekskill, New York 1953
Nolan, Thomas Brennan, U. S. Geological Survey, Washington 25, D. C. 1935
Nolan, Dr. Val, Jr., Indiana University School of Law, Bloomington, Indiana 1952
Noland, Mrs. Hulbert V., Indiana Hills Trail, Louisville 7, Kentucky 1954
Noll, Edward M., Box 94, Hatboro, Pennsylvania 1956
Nooe, Miss Sarah M., Queens College, Charlotte 7, North Carolina .. 1954
Norby, Darwin E[mil], Department of Biology, Virginia Polytechnic Institute, Blacksburg, Virginia 1950
Noren, Oscar B., 25415 Powers Rd., Farmington, Michigan 1947
Norman, Edward d'A[ubigny], Box 302, Chatham, Massachusetts ... 1951
EM Norris, Dr. Robert A[llen], (University of Georgia Ecological Studies), 1918 Hahn Ave., Aiken, South Carolina ..... (1939) 1953
North, George W[ebster], 249 Charlton Ave., W., Hamilton, Ontario, Canada 1938
Northrop, Mrs. Harson A., 358 East Main St., Owatonna, Minnesota 1952
Northrop, Myron, 9304 Sylvan Hills Rd., North Little Rock, Arkansas 1949
Northwood, John d'Arcy, Mill Grove, Audubon, Pennsylvania 1946
Norton, Mrs. Donald H., Box 157, Geneva, Florida 1954
L Novaes, Fernando [da] C[osta], Museu Paraense Emilio Goeldi, Caixa Postal 399, Belem, Pará, Brazil 1949
Novy, Dr. Frank O., 420 S. Jefferson Ave., Saginaw 6, Michigan 1952
Nutt, David C., Dogford Rd., Etna, New Hampshire 1938
Nyc, Frederick F[rancis], P. O. Box 451, McAllen, Texas 1939
EM Oakeson, Dr. Barbara Blanchard, University of California, Santa Barbara College, Goleta, California ..... (1947) 1951
Oates, Mrs. Norma C., 5908 Charlotte St., Houston 5, Texas 1955
LF Oberholser, Dr. Harry C[hurch], 2933 Berkshire Rd., Cleveland Heights, Cleveland 18, Ohio ..... (1888) 1902
Oberly, Donald B., R. R. 2, Urbana, Ohio 1947
O'Brien, Paul J[oseph], 315 Grove St., Haddonfield, New Jersey 1953
O'Brien, William V., 502 Jordan, Jacksonville, Illinois 1956
Odin, Clyde R., 1326 13th St., Bismarck, North Dakota 1957
Odom, Babette Moore [Mrs. Edgar R.], P. O. Box 458, Orange, Texas 1949
F Odum, Dr. Eugene P[leasants], University of Georgia, Athens, Georgia (1932) 1951
Oehser, Paul Henry, Smithsonian Institution, Washington 25, D. C. 1940
Oeming, Albert F., 8448–136 St., Sub. P. O. 28, Edmonton, Alberta, Canada 1954
Ogilvie, Philip W[oodworth], Museum of Natural History, University of Kansas, Lawrence, Kansas 1956
O'Hearn, George Henry, 62 North St., Auburn, New York 1957

Olmstead, Rossiter D., 1323 Fern St., New Orleans 18, Louisiana 1952
Olsen, Dr. Richard E[llsworth], 3325 Franklin Rd., Apt. 3, Bloomfield Hills, Michigan 1949
Olson, Leo B[ernie], 835 S. First St., Dekalb, Illinois 1949
L Olson, Mrs. Simon [Gladys Elizabeth], 33 Harvard Dr., Lake Worth, Florida 1951
O'Neil, Mrs. Norah Selby, 1311 Bonham St., Commerce, Texas 1948
Orbison, Douglas Campbell, Guard Hill Rd., Mt. Kisco, New York .. 1947
O'Regan, Miss Jane D., 23 Crockett Ave., Dorchester 24, Massachusetts 1955
O'Reilly, R[alph] A[nthony], Jr., Box 132, Davisburg, Michigan .. 1940
Oresman, Stephen B[ergel], 15A Charles Bank Rd., Newton 58, Massachusetts 1948
Ormondroyd, Jesse, 2104 Copley Ave., Ann Arbor, Michigan 1949
Orr, Miss E[mma] Virginia, N. Valley Rd., Paoli, Pennsylvania 1939
EM Orr, Dr. Robert T[homas], California Academy of Sciences, Golden Gate Park, San Francisco 18, California ..... (1937) 1941
Orth, John C., Trailside Museum, Bear Mountain, New York 1936
Osgood, Dr. Howard, 675 Delaware Ave., Buffalo 2, New York 1954
Oswald, Stanley J. D., 260 Wellington Crescent, Winnipeg, Manitoba, Canada 1954
Overing, Robert, R. F. D. 2, Chapin, South Carolina 1929
Owen, W[illiam] Plass, P. O. Box 516, ChulaVista, California 1957
Owre, Oscar T[heodore], Department of Zoology, University of Miami, Coral Gables, Florida 1934
Owsley, Dr. W. C., Jr., 6213 Chevy Chase Dr., Houston 19, Texas .. 1956
Paap, Charles H., 275 Nieto Ave., Long Beach 3, California 1957
L Pack, Arthur Newton, P. O. Box 5695, Tucson, Arizona 1929
Packard, Christopher Moore, Portland Museum of Natural History, 22 Elm St., Portland, Maine 1952
Packard, Fred Mallery, 24 Elizabeth Lane, Rt. 2, Fairfax, Virginia .. 1935
Packard, Robert Lewis, Kansas Museum of Natural History, Lawrence, Kansas 1953
Paeske, Gordon L., 522 12th St., Watertown, Wisconsin 1955
Paff, Dr. William A[lfred], 2601 E. Jackson Blvd., Elkhart, Indiana 1927
Paine, Charles J., Old Road, Weston, Massachusetts 1954
Paine, Robert T[reat], III, 2 Hubbard Park, Cambridge, Massachusetts 1950
Pallas, Miss Dorothy Constance, 107 Jefferson St., Wood-Ridge, New Jersey 1951
Palmer, Paul, La Trappola, W. Mountain Rd., Ridgefield, Connecticut 1957
LF Palmer, Dr. Ralph S[imon], New York State Museum, State Education Bldg., Albany 1, New York ..... (1932) 1956
HL Palmer, Samuel Copeland, Swarthmore College, Swarthmore, Pennsylvania 1899
Palmer, Mrs. Theodore Sherman [Bertha Ellis], 1939 Biltmore St., N. W., Washington, D. C. 1918
Palmquist, C[larence] O[scar], 834 Windsor Rd., Glenview, Illinois 1950
Paludan, Dr. Knud, Vildtbiologisk Station, Rönde, Kalo, Denmark .. 1953
Park, Charles F[rederick], Jr., Department of Geology, Stanford University, Palo Alto, California 1936

Parker, Clarence J., 821 N. Garfield Ave., Alhambra, California 1947
Parker, Harry C[larence], Rt. 1, Box 234-C, Alexandria, Virginia .. 1927
Parker, Henry M[elville], Trinity Place, Wayland, Massachusetts .. 1940
EM Parkes, Dr. Kenneth Carroll, Section of Birds, Carnegie Museum, Pittsburgh 13, Pennsylvania ..... (1947) 1953
Parks, Richard A., 2303 Pembrook Pl., N. E., Atlanta, Georgia 1947
Parmalee, Dr. Paul W., Curator of Zoology, Illinois State Museum, Springfield, Illinois 1953
Parmelee, David F[reeland], Department of Zoology, University of Oklahoma, Norman, Oklahoma 1948
Parmeter, [Benjamin] David, Armstrong Woods Rd., Guerneville, California 1957
Parsons, Thomas Sturges, 86 Godwin Ave., Midland Park, New Jersey 1953
Parsons, William G., P. O. Box 386, Ely, Nevada 1954
LEM Partridge, William H., Belgrano 363, Caseros F.C.S.M., Buenos Aires, Argentina ..... (1953) 1956
Patten, Harvey Lee, R. F. D. 1, Woodland Rd., Morristown, New Jersey 1957
Patten, Dr. John A., Box 396, Department of Biology, Middle Tennessee State College, Murfreesboro, Tennessee 1948
Patterson, Miss Clarice E., M. R. A., Box 300, Bangor, Maine 1952
Paulson, C. W. Geoffrey, The Monotype Corp. Ltd., Salfords, Redhill, Surrey, England 1947
Paulson, Dennis R[oy], 7280 S. W. 9th St., Miami 44, Florida 1952
Payne, Miss Rinda Mary, Box 320, R. F. D. 4, Portland, Maine 1955
EM Paynter, Dr. Raymond A[ndrew], Jr., Museum of Comparative Zoology, Harvard University, Cambridge 38, Massachusetts .... (1946) 1952
L Peabody, James [Bishop], 2 East 62 St., New York 21, New York .. 1940
Peake, Cyril Blackett, Dowling Court, Apt. 530, 99 Dowling Ave., Toronto, Ontario, Canada 1952
Pearse, Theed, Comox, Vancouver Island, British Columbia, Canada 1926
Pearson, Allen M[obley], P. O. Box 1031, Auburn, Alabama 1940
Peck, Dr. George K[elday], 1030 Lakeshore Rd. E., Oakville, Ontario, Canada 1956
Peckworth, Howard F., 114 N. Washington Ave., Batavia, Illinois 1956
Peelle, Miles L., 1039 College Ave., Adrian, Michigan 1948
Peffer, Mrs. Thomas A., 49 West Depot St., Hellertown, Pennsylvania 1953
Pelch, William Edward, 5016 West 25th Place, Cicero 50, Illinois 1955
L Pell, Walden, II, Rev., St. Andrew's School, Middletown, Delaware .. 1938
Peloubet, Mrs. Sidney W., Moose Hill Rd., Guilford, Connecticut 1939
F Pemberton, John Roy, 714 W. Olympic Blvd., Los Angeles 15, California ..... (1918) 1953
Penberthy, Alan H., 21 Rutland Rd., Freeport, New York 1954
Pennington, Tully S[anford], Box 74, Collegeboro, Georgia 1952
Pepall, Robert L., 29 Wilberton Rd., Toronto 7, Ontario, Canada 1952
Pepper, William, 20 E. Bells Mill Rd., Philadelphia 18, Pennsylvania 1930
L Perkins, Dr. Anne Elizabeth, 16 Sewall Rd., South Berwick, Maine 1917
Perry, Frances, Greene, Rhode Island 1949
Pessino, Miss Catherine M., 630 Gramatan Ave., Mt. Vernon, New York 1952

EM	Peters, Harold S[eymour], 968 Cumberland Rd., N. E., Atlanta 6, Georgia ..... (1924)	1947
	Peters, Stuart S[anford], Department of Mines and Resources, The Wildlife Division, St. Johns, Newfoundland, Canada	1951
	Petersen, Arnold J[erome], 712 W. 3rd St., Northfield, Minnesota	1951
	Petersen, Peter C., Jr., 620 E. 30th St., Davenport, Iowa	1952
	Peterson, Alfred, Box 201, Brandt, South Dakota	1920
	Peterson, Arthur S., 40 Overlook Rd., Cedar Grove, New Jersey	1952
	Peterson, Miss Eleanor L[elia], 5400 Lake Mendota Dr., Madison 5, Wisconsin	1956
	Peterson, Lawrence M[inor], 531 South Ave., Bradford, Pennsylvania	1949
LF	Peterson, Roger Tory, Neck Road, Old Lyme, Connecticut .... (1929)	1948
EM	Petrides, Dr. George A[than], Michigan State College, Department of Fisheries and Wildlife, East Lansing, Michigan ..... (1941)	1949
LF	Pettingill, Dr. Olin Sewall, Jr., Wayne, Maine ..... (1930)	1947
	Pettit, Lincoln C[oles], 330 Southlawn Ave., East Lansing, Michigan	1949
	Pettock, Anne G[race], 104 North 10th St., Allentown, Pennsylvania	1950
	Peyton, Sidney Burns, R. D. 2, Box 260, Fillmore, California	1946
	Phares, John Haden, 4539 Meadow Ridge Dr., Jackson 6, Mississippi	1957
	Phelps, James H[arvey], Jr., 717 S. Fourth Ave., Pocatello, Idaho	1933
L	Phelps, Mrs. Kathleen Deery, Apartado 2009, Caracas, Venezuela, S. A.	1949
F	Phelps, William H[enry], Apartado 2009, Caracas, Venezuela, S. A. ..... (1937)	1952
LEM	Phelps, William H., Jr., Apartado 2009, Caracas, Venezuela, S. A. (1940)	1948
	Philbrick, Miss Hazel B., 5093 Washington Blvd., St. Louis 8, Missouri	1957
LEM	Phillips, Dr. Allan R[obert], c/o L. L. Hargrave, P. O. Box 1979, Globe, Arizona ..... (1932)	1946
	Phillips, Homer Wayne, 2110 Morse St., Houston 19, Texas	1948
	Phillips, Richard E[dward], Fernow Hall, Cornell University, Ithaca, New York	1949
	Phillips, Richard S[tuart], 834 Liberty St., Findlay, Ohio	1946
	Phillips, William B., 166 East 96th St., New York 28, New York	1950
	Pickens, A[ndrew] L[ee], Presbyterian Junior College, Maxton, North Carolina	1949
	Pickering, Robert, 66 Menno St., Waterloo, Ontario, Canada	1948
	Pielou, William P., 1549 Ann St., East Lansing, Michigan	1953
	Pieratt, James F., 6810 Hendon Lane, Sharpstown, Bellaire, Texas	1955
EM	Pierce, Fred John, Winthrop, Iowa ..... (1948)	1950
L	Pierce, Robert Allen, 1222–80th St., West Des Moines, Iowa	1941
	Pigot, Bruce Coffin, Mt. Stewart, Prince Edward Island, Canada	1956
EM	Pirnie, Dr. Miles D., Conservation Bldg., Michigan State University, East Lansing, Michigan ..... (1919)	1937
F	Pitelka, Dr. Frank A[lois], Museum of Vertebrate Zoology, University of California, Berkeley 4, California ..... (1937)	1948
	Pittman, James A[llen], 1006–19th St. S., Birmingham, Alabama	1947
EM	Plath, Karl, 114 S. East Ave., Oak Park, Illinois ..... (1925)	1950
	Platt, Dwight Rich, Department of Biology, Bethel College, North Newton, Kansas	1953
	Platt, William, 216 Rodgers Forge Rd., Baltimore 12, Maryland	1949
	Plimpton, Sarah, 1165 Fifth Ave., New York 29, New York	1957

HL Poe, Miss Margaretta, Earl Court, St Paul and Preston Sts., Baltimore, Maryland 1899
Pomeroy, F[red] E[lmer], 342 College St., Lewiston, Maine 1920
Poole, Cecil A[very], 1764 Topeka Ave., San Jose 26, California 1941
EM Poole, Dr. Earl L[incoln], Public Museum, Reading, Pennsylvania ..... (1916) 1942
Poole, Frederick Parsons, R. F. D. 1, Box 591, Westbrook, Maine 1954
LEM Poor, Hustace Hubbard, 7 Colonial Court, New Canaan, Connecticut ..... (1934) 1950
Pope, Lillian Gorzycki, Ruta Rural 1, Buzón No. 38, Río Piedras, Puerto Rico 1948
Porter, Eliot F[urness], Rt. 1, Box 33, Santa Fe, New Mexico 1947
Porter, Richard Dee, Big Bend National Park, Texas 1948
Porter, Dr. T[homas] Wayne, Department of Zoology, Michigan State University, East Lansing, Michigan 1937
Pospichal, Leo B., Box 191, Algonac, Michigan 1952
Potter, Beatrice B[rown] [Mrs. George C.], 2111 Malvern Road, Charlotte 7, North Carolina 1948
Potter, David M[orris], 1557 Timothy Dwight College, Yale University, New Haven, Connecticut 1946
EM Potter, Julian K[ent], 437 Park Ave., Collingswood, New Jersey (1912) 1944
Potter, L[ouis] Henry, R. D. 1, West Rutland, Vermont 1922
Potter, N[athan] S., III, Rt. 5, Huntington, New York 1952
L Potts, F[red] A[ndrew], 404 S. Main St., Waupaca, Wisconsin 1922
LEM Pough, Richard H[ooper], 33 Highbrook Ave., Pelham, New York ..... (1922) 1947
Powers, Miss Myrtle M., Western Michigan College, Kalamazoo, Michigan 1956
Powles, Percival M[ount], Zoology Department, University of Western Ontario, London, Ontario, Canada 1952
Prather, Mrs. Elizabeth H[unt], 400 Center Ave., Westwood, New Jersey 1951
Prather, Millard F[illmore], P. O. Box 559, Fairfield, Alabama 1939
Pray, Russell H[arvey], 662 Santa Rosa Ave., Berkeley 7, California 1949
FE Preble, Edward A[lexander], 3027 Newark Street, N. W., Washington, D. C. ..... (1892) 1935
Preisick, G. Roger, 23 Westminster Rd., Baldwin, New York 1955
Prendergast, J[ames] Stafford, Eden Hill, Tyrone, Pennsylvania 1949
Prescott, Dr. Kenneth Wade, Kansas City Museum, 3218 Gladstone Blvd., Kansas City, Missouri 1947
Preston, Charles Putnam, 1734 South Oval Dr., Sarasota, Florida .. 1954
EM Preston, Dr. F. W., Box 149, Butler, Pennsylvania ..... (1952) 1956
Prestwich, Arthur A[lfred], 61 Chase Rd., Oakwood, London N. 14, England 1949
Primley, Walter S., c/o American Chicle Co., 405 Lexington Ave., New York 17, New York 1934
Pringle, Cornelia C[ovington], 1816 Vallejo St., San Francisco 23, California 1950
Prior, E. Gertrude, Sweet Briar, Virginia 1947
L Procter, Mrs. Lillian S[anford], Williamstown, Massachusetts 1928

Prosser, Albert L[aurence], Box H., Springvale, Maine 1951
Pruitt, Mrs. William O., Jr., (Erna N[auert]), Box 282, College, Alaska 1948
Prychodko, Dr. W[illiam], c/o Detroit Institute of Cancer Research, 4811 John R. Street, Detroit 1, Michigan 1954
Puett, Miss May W[ilson], P. O. Box 2183, Greenville, South Carolina 1952
Puleston, Dennis, Brookhaven National Laboratory, Upton, Long Island, New York 1956
Pulich, Warren M[ark], 2021 Rosebud Dr., Irving, Texas 1949
Putman, William L[loyd], Dominion Entomological Laboratory, Vineland Station, Ontario, Canada 1937
Putnam, Loren Smith, Department of Zoology, Ohio State University, Columbus 10, Ohio 1942
Pyle, Jean G., 1614 Walnut St., Berkeley, California 1952
Pyle, Dr. Lewis W[illiam], Department of Chemistry, Allegheny College, Meadville, Pennsylvania 1954
Pyle, Robert L[awrence], 6117 Radford Dr., Seattle 15, Washington 1953
Quay, Dr. Bill [Wilbur Brooks], Department of Zoology, University of California, Berkeley 4, California 1945
Quay, Dr. Thomas L., Zoology Department, North Carolina State College, Raleigh, North Carolina 1942
Queeny, Edgar M[onsanto], Route 13, Kirkwood, Missouri 1950
Quilliam, Mrs. C. D. [Helen R.], R. R. 1, Kingston, Ontario, Canada 1954
Rabor, Dioscoro S[iarot], Silliman University, Dumaguete City, Negros Oriental, Philippines 1951
EM Racey, Kenneth, 6542 Lime St., Vancouver, British Columbia, Canada ..... (1921) 1950
Radford, Keith Warren, Department of Biological Sciences, San Jose State College, San Jose 14, California 1957
Raitt, Ralph J., Jr., Museum of Vertebrate Zoology, University of California, Berkeley 4, California 1955
Ramsay, A[lfred] Ogden, McDonogh School, McDonogh, Maryland 1949
Ramsey, D. Hiden, Box 8115, Ashville, North Carolina 1954
Ramsey, Ralph L., 1578 N. Decatur Rd., Atlanta 6, Georgia 1947
F Rand, Dr. Austin L[oomer], Chicago Natural History Museum, Roosevelt Rd. and Lake Shore Dr., Chicago 5, Illinois .... (1927) 1943
L Randall, Clarence B[elden], 700 Blackthorn Rd., Winnetka, Illinois 1948
Randall, Robert N[eal], 928 Sixteenth St., Bismarck, North Dakota 1939
Randolph, Evan, Corner of Seminole and Chestnut Aves., Philadelphia 18, Pennsylvania 1949
Rankin, Henry A[shby], Jr., Box 803, Fayetteville, North Carolina 1952
LEM Rapp, Dr. William Frederick, Jr., 430 Ivy Ave., Crete, Nebraska (1939) 1950
L Raymond, Olney M[artin], 129 Lincoln Place, Brooklyn 24, New York 1930
Raynor, Gilbert S[idney], Wading River Rd., Manorville, Long Island, New York 1937
Rea, Gene, 251 Leland Ave., Columbus 1, Ohio 1954
L Read, Bayard W[hitney], Upper Dogwood Lane, Rye, New York 1949
Read, Commander Duncan H., Middleburg, Virginia 1946
Read, S[imon] H. Jervis, British Embassy, Teheran, Iran 1955
L Rebmann, G[odfrey] Ruhland, Jr., 729 Millbrook Lane, Haverford, Pennsylvania 1948

Redjives, C[asimir] F[rancis], 881 Washington Ave., Brooklyn 25, New York 1949
Reece, Maynard, 3405 50th St., Des Moines 10, Iowa 1948
Reed, Edward B., Department of Biology, University of Saskatchewan, Saskatoon, Canada 1953
Reed, Parker Crosby, 27 Hayes Ave., Lexington 73, Massachusetts 1948
Reese, Dr. Carl R[ichard], The Ohio State University, Department of Zoology and Entomology, Columbus 10, Ohio 1953
Reeves, Henry M[ilton], Box 1786, 1213 W. Harrison St., Harlingen, Texas 1955
Regennas, Charles H[enry], Jr., 130 W. Lemon St., Lititz, Pennsylvania 1950
Rehfisch, Carol, c/o Morse Erskine, 233 Chestnut St., San Francisco 11, California 1948
HL Rehn, James Abram Garfield, Academy of Natural Sciences, Logan Square, Philadelphia, Pennsylvania 1901
Reichert, Mrs. R[obert] J[acob] [Elsa], 14 West First St., Mount Vernon, New York 1950
Reid, Mrs. Bruce [Bessie M.], Box 883, Silsbee, Texas 1918
Reid, Neil J., 4819 A 28th St., S., Arlington 6, Virginia 1953
Reid, William A., 38 South 2nd. West, Brigham City, Utah 1956
Reilly, Dr. Edgar M[ilton], Jr., P. O. Box 34, Old Chatham, New York 1947
Reith, Marie, 120–05 Long St., Jamaica 5, New York 1952
Restivo, Ernest Joseph, 423 Third St., Brooklyn 15, New York 1957
L Rett, Egmont Z[achary], Santa Barbara Museum of Natural History, Santa Barbara, California 1940
Reynard, George B[ergin], 728 Parry Ave., Palmyra, New Jersey 1950
Reynolds, Dr. Harold C., Museum of Vertebrate Zoology, University of California, Berkeley 4, California 1947
Reynolds, Dr. T. Eric, 140 Estates Drive, Piedmont 11, California 1941
Reynolds, Temple A., Biology Building, University of Utah, Salt Lake City 12, Utah 1957
Reynolds, Thomas George, 92 Pine Ridge Rd., Pine Ridge, Media, Pennsylvania 1952
Rice, Dale W[arren], Box 1, U. S. Naval Station, Navy 3080, c/o Fleet Post Office, San Francisco, California 1949
Rice, Ward J[ennings], 5250 N. Pennsylvania St., Indianapolis 20, Indiana 1913
Rich, Mrs. Eva, 150 W. 80th St., New York 24, New York 1946
Richards, Dr. John W[atson], R. F. D. 1, Emmitsburg, Maryland 1953
Richards, Tudor, "Hurricane Farm," Keene, New Hampshire 1949
Richardson, David L[ord], Eastern Point, Gloucester, Massachusetts 1949
L Richardson, Flora S. [Mrs. W. D.], 4318 Oakenwald Ave., Chicago 15, Illinois 1925
Richardson, Dr. Frank, Department of Zoology, University of Washington, Seattle, Washington 1939
Richter, Carl H., 703 Main St., Oconto, Wisconsin 1939
Richter, Dr. G[eorge] William, Guide Bldg., Canfield, Ohio 1951
Rickert, Jon Edward, 629 South Woodlawn Ave., Bloomington, Indiana 1957

Ricks, John T[homas], East Gate Road, Lloyd Harbor, Huntington, Long Island, New York 1951
Ridgely, Dr. Beverly S[ellman], 28 Everett Ave., Providence 6, Rhode Island 1949
Riedel, Marguerite Meta, 615 East Court St., Seguin, Texas 1956
Riley, Mrs. Gerard C., Box 239, Churchville, Pennsylvania 1956
LF Ripley, Dr. S[idney] Dillon, II, Peabody Museum of Natural History, Yale University, New Haven 11, Connecticut ..... (1938) 1951
Rising, Gerald R[ichard], 72 Allen's Creek Rd., Rochester 18, New York 1952
Rising, James David, 4406 Sunrise Dr., Kansas City 23, Missouri 1956
Ritchie, Dr. Robert C[harles], Mansefield Farm, R. R. 2, King, Ontario, Canada 1944
LEM Robbins, Chandler Seymour, Patuxent Research Refuge, Laurel, Maryland ..... (1944) 1949
Robbins, Chandler, Jr., 7128 Point of Rocks Circle, Sarasota, Florida 1934
Robbins, Mrs. Eleanor C., Patuxent Research Refuge, Laurel, Maryland 1939
Roberts, Bertrand, 6951 33rd St., N. W., Washington 15, D. C. 1944
Roberts, Mrs. Frances F., 1134 Glendon Ave., Los Angeles 24, California 1941
Roberts, Harold D[avis], 610 Harrison St., Black River Falls, Wisconsin 1949
Roberts, H[oward] Radclyffe, Box 490, Bryn Mawr, Pennsylvania .. 1924
HL Roberts, William Ely, 29 W. Stratford Ave., Lansdowne, Pennsylvania 1902
EM Robertson, John McB[riar], 1677 W. 9th St., Pomona, California (1920) 1948
Robertson, Dr. William B[eckwith], Jr., Route 2, Box 83-C, Homestead, Florida 1955
Robins, Dr. C[harles] Richard, The Marine Laboratory, University of Miami, Coral Gables, Florida 1948
Robinson, Lucile W., Route 2, Box 199, Boring, Oregon 1951
Robinson, Thane S[parks], Department of Biology, Western Michigan College, Kalamazoo, Michigan 1952
Rockefeller, William A[very], Room 1301 Lincoln Bldg. 60 East 42nd St., New York 17, New York 1949
Roesler, M[ax] Stuart, June Road, Cos Cob, Connecticut 1949
Roesler, Mrs. M[ax] Stuart [Carol S.], June Road, Cos Cob, Connecticut 1949
Roest, Dr. Aryan I., Biological Sciences, California State Polytechnic College, San Luis Obispo, California 1954
Rogan, Mrs. Francis E. [May L.], 327 South 12th East, Salt Lake City 2, Utah 1953
LEM Rogers, Charles H[enry], East Guyot Hall, Princeton, New Jersey (1904) 1921
L Rogers, Major Gerald [Talbot], 643 N. Beachview, Ft. Walton Beach, Florida 1941
Rogers, [Henry] Thomas, E. 10820 Maxwell, Opportunity, Washington 1947
Rogers, John Mather, 17 Phelps St., Binghamton, New York 1938
Rogers, John P[atrick], Stephens Hall, University of Missouri, Columbia, Missouri 1953

Rogers, Dr. Kay T[rowbridge], Department of Zoology, Oberlin College, Oberlin, Ohio 1949
Rogers, Dr. T. E., Department of Biology, Cornell College, Mount Vernon, Iowa 1956
Rogers, Rev. Wallace, 715 Ellsworth Drive, N. W., Atlanta, Georgia 1921
Rogers, Mrs. Walter E., 911 E. North St., Appleton, Wisconsin 1932
Rokosky, Emil J[ames], Racine Zoological Park, 2131 N. Main St., Racine, Wisconsin 1949
Rolle, Francis J., Box 95, Aguadilla, Puerto Rico 1956
L Rollin, Noble, Primrose Cottage, Glanton, Northumberland, England 1946
Romaine, Mrs. Lawrence B., Weathercock House, Middleboro, Massachusetts 1954
Rooney, James, Jr., 1514 S. 12th Ave., Yakima, Washington 1943
Root, Oscar M[itchell], Brooks School, North Andover, Massachusetts 1940
Root, Richard Bruce, 265 Ann St., Plymouth, Michigan 1956
Rosche, Richard C., 48 Dartmouth Ave., Buffalo 15, New York 1954
Rose, W[illiam] C[umming], 710 W. Florida Ave., Urbana, Illinois 1950
Rosegay, Mary Louise [Mrs. Harold], c/o Major H. Rosegay, Fitzsimons Army Hospital, Denver, Colorado 1942
Rosenthal, Dr. Morton Lawrence, 264–17 Grand Central Parkway, Little Neck, New York 1953
Rosin, Katharine S. [Mrs. Axel G.], 691 W. 247th St., New York 71, New York 1955
Ross, Aaron B[elnap], 3417 Fillmore Ave., Ogden, Utah 1947
Ross, C[harles] Chandler, 710 Wolcott Dr., Philadelphia 18, Pennsylvania 1936
Ross, Hollis T[revor], 29 S. 2nd St., Lewisburg, Pennsylvania 1947
L Ross, J[ames] B[rent], 1121 Green Briar Rd., Barclay Farm, Haddonfield, New Jersey 1949
L Ross, Mrs. Mary Reeve Spear, 455 E. Ridge St., Marquette, Michigan 1954
Ross, Reuben J., P. O. Box 190, Georgetown, Connecticut 1922
Ross, Roland C., 1820 Bushnell Ave., South Pasadena, California ... 1925
Rothschild, Brian James, 1224 Clinton Ave., Irvington 11, New Jersey 1955
Rowinski, Ludwig J., Box 86, College, Alaska 1947
Rowley, J[ohn] Stuart, 305 Sequoia Dr., Pasadena 2, California 1930
Rubendall, Elizabeth, 822 W. 5th, Topeka, Kansas 1947
Rubey, William W., 5216 Westwood Dr., Washington 16, D. C. 1933
Rudd, Dr. R[obert] L., Department of Zoology, University of California, Davis, California 1939
Rudolph, Royston R[ice], Jr., New Holland, North Carolina 1949
Rumsey, Dr. William Lacy, 1336 North Ave., Elizabeth 3, New Jersey 1953
Runk, Alfred E., Ramsey, New Jersey 1952
Ruos, James Leigh, Room 202, Chem-Zoology Building, University of Wyoming, Laramie, Wyoming 1957
Russak, Maurice L[ouis], 1675 Metropolitan Ave., New York 62, New York 1951
Russell, Dr. L[oris] S[hano], National Museum of Canada, Ottawa, Ontario, Canada 1951
Russell, Rosemary, 25 Kenwood Rd., Tenafly, New Jersey 1953

Russell, Stephen M[ims], 267 East Valley St., Abingdon, Virginia ... 1949
Ruth, Miss Edna L., 302 West Second St., Halstead, Kansas 1956
Rutter, Russell J[ames], Box 794, Huntsville, Ontario, Canada 1928
Ryder, Ronald A[rch], Biology Department, Wartburg College, Waverly, Iowa 1949
Rylander, [Michael] Kent, 420 Market, Galveston, Texas 1953
Ryser, Dr. Fred A., Jr., Assistant Prof. Biology, Nevada Southern, Box 2267 Huntridge Station, Las Vegas, Nevada 1951
Sabin, Walton B., 652 Kenwood Ave., Slingerlands, New York 1942
Sage, Bryan Leonard, 11 Deepdene, Potters Bar, Middlesex, England 1957
Sage, Evan V., R. R. 3, Waterloo, Iowa 1947
Sallee, Roy M., Department of Biology, Western Illinois State Teachers College, Macomb, Illinois 1931
Salt, Dr. George William, Division of Zoology, University of California, Davis, California 1947
Salyer, John, 4273 Menlo Ave., San Diego 15, California 1957
Sample, Marian [Mrs. Frank], 252 Cunningham Dr., Colorado Springs, Colorado 1956
Sampson, Dr. Edward, Guyot Hall, Princeton, New Jersey 1936
Sampson, W[alter] B[ehnard], 1005 N. San Joaquin St., Stockton, California 1922
Sanborn, Alvah W., Pleasant Valley Sanctuary, Lenox, Massachusetts 1946
Sanchez-Mejorada, Carlos, Jr., Montes Urales 632, Mexico 10, D. F., Mexico 1942
Sandford, William F[oster], 87 Main St., Matawan, New Jersey 1951
Sands, James Lester, 2917 Franciscan N. E., Albuquerque, New Mexico 1955
Sanger, Mrs. Marjory Bartlett, 155 Newbury St., Boston 16, Massachusetts 1955
Sather, Carlyle Wilmar, 7880 Mission St., Colma, California 1953
Sather, J. Henry, Department of Biological Sciences, Western Illinois State College, Macomb, Illinois 1956
Satter, John M[arcus], 4500 Millersville Rd., Indianapolis 5, Indiana 1952
Satterly, Jack, 100 Castlewood Road, Toronto 12, Ontario, Canada 1947
Sauer, Dr. Gordon C[henoweth], 425 E. 63rd St., Kansas City 10, Missouri 1948
Saugstad, N. Stanley, R. R. 4, Minot, North Dakota 1945
F Saunders, Aretas Andrews, Box 141, Canaan, Connecticut ..... (1907) 1950
EM Saunders, Dr. George B[radford], Fish and Wildlife Service, 624 Peachtree, Seventh Bldg., Atlanta 5, Georgia ..... (1925) 1947
Saunders, Richard M[errill], 9 McMaster Ave., Toronto, Ontario, Canada 1935
Savery, Don B[rooks], 8630 Chilson Rd., R. F. D. 1, Brighton, Michigan 1953
Savile, Dr. D[ouglas] B[arton] O[sborne], 6 Oakland Ave., Ottawa, Ontario, Canada 1949
Sawyer, Dorothy M[ay], 419 Euclid Ave., Syracuse, New York 1936
Sawyer, Ernest Walker, 425 North June St., Los Angeles 4, California 1954
Scattergood, Leslie W[ayne], Fish and Wildlife Service, West Boothbay Harbor, Maine 1949
Schaefer, Oscar Frederick, 825 Merchants Rd., Rochester 9, New York 1916

Schaffner, Art, 170 Laurel St., Buffalo 8, New York 1957
Schaller, George Beals, 1315 Drake St., Madison, Wisconsin 1953
Scharffenberg, R[ichard] S[hirley], 511 Boyd Ct., Washington 12, D. C. 1950
Schaughency, C[harles] B[ertram], Village Rd., Green Village, New Jersey 1949
Scheetz, Mrs. Francis H[arley], [Virginia S.], 15 W. Old Gulph Rd., Gladwyne, Pennsylvania 1948
Schemnitz, Sanford David, Oklahoma Cooperative Wildlife Research Unit, Oklahoma A and M College, Stillwater, Oklahoma 1957
Schetty, Frank R[obert], 237 La Salle Ave., Hasbrouck Heights, New Jersey 1951
Schmidt, Thomas B., Jr., 3700 Sharon St., Harrisburg, Pennsylvania 1947
Schmittner, Stella Marie, Zoology Department, Colorado College, Colorado Springs, Colorado 1957
Schneider, Robert Wayne, 41 Laurel St., Fort Collins, Colorado 1957
Schnell, Jay H[eist], 1503 Bethlehem Pike, Flourtown, Pennsylvania 1952
Schnitzer, Albert, 155 Wild Hedge Lane, Mountainside, New Jersey 1945
Scholes, Robert T[hornton], U. S. O. M. La Paz, Department of State, Washington 25, D. C. 1948
LF Schorger, Dr. Arlie William, 168 N. Prospect Ave., Madison, Wisconsin ..... (1913) 1951
Schreiber, Ralph Walter, 1471 Cleveland Rd., Wooster, Ohio 1957
Schubert, Maxwell, 445 E. 68 St., New York 21, New York 1956
L Schultz, Albert B[igelow], Jr., Penryn Park, Port Hope, Ontario .. 1948
Schumm, William G., 302 C St., La Porte, Indiana 1944
Schwab, Larry, Kingwood, West Virginia 1955
Schwartz, C[harles] W[alsh], 131 Forest Hill, Jefferson City, Missouri 1951
Schwartz, Paul A., Apartado 1766, Caracas, Venezuela 1952
Schwartz, Herbert F[erlando], American Museum of Natural History, Central Park West at 79th St., New York, New York 1925
Schweitzer, Robert David, 1 Blackstone Pl., Riverdale 71, New York, New York 1954
Sciple, George W[ashington], King County Hospital, 1511 Lander St., Seattle 44, Washington 1949
Scotland, Dr. Minnie B[rink], 42 Continental Ave., Cohoes, New York 1936
L Scott, Mrs. Frank A[rthur], 1508 La Loma Ave., Berkeley 8, California 1954
Scott, Frederic R[obert], 115 Kennondale Lane, Richmond 26, Virginia 1943
Scott, Dr. Oliver K[ennard], 137 E. 13th St., Casper, Wyoming 1936
Scott, Dr. Thomas G[eorge], Game Specialist and Head, Section of Game Research and Management, Illinois Natural History Survey, Urbana, Illinois 1938
Scott, Walter E[dwin], 1721 Hickory Drive, Madison 5, Wisconsin .. 1937
Seale, David E[dwin], 724 Napoleon St., Rockford, Illinois 1954
Seaman, G. A., Box 472 - Christiansted, St. Croix, Virgin Islands 1957
Seamans, James O., Alcott Rd., Concord, Massachusetts 1957
Sears, Joseph Alden, Hillside Rd., Northbrook, Illinois 1934
Seeber, Edward L., 213 Columbia St., Ithaca, New York 1943
Seely, Warner, 2171 Middlefield Rd., Cleveland Heights 6, Ohio 1948
Sefton, J[oseph] W[eller], Jr., San Diego Trust and Savings Bank, Box 1871, 638 F. St., San Diego 12, California 1922

Sehl, Robert H., 7027 Hegerman St., Philadelphia, Pennsylvania 1949
Seibert, Dr. Henri C[levet], Ohio University, Athens, Ohio 1934
Seibert, Robert F[redrick], 17 Canoe Brook Rd., Short Hills, New Jersey 1949
Seiple, Stanley J., Grove City College, Grove City, Pennsylvania 1927
Seiter, Floyd B., Box 113, New Haven, Michigan 1956
Selander, Dr. Robert K[eith], Department of Zoology, University of Texas, Austin 12, Texas 1952
Selby, Gertrude Pettit [Mrs. James A.], Lookout Point, Ridgeville, Ontario, Canada 1947
Sener, Ruth, 233 Charlotte St., Lancaster, Pennsylvania 1949
Serle, Dr. William, 64 Strathearn Rd., Edinburgh 9, Scotland 1955
L Shackleton, Walter H[odge], R. R. 1, Box 76A, Prospect, Kentucky 1946
Shadle, Dr. Albert R[ay], 143 University Ave., Buffalo 14, New York 1928
Shadowen, Herbert Edwin, Box 588 Louisiana Polytechnic Institute, Ruston, Louisiana 1956
Shaffer, Chester M[onroe], Route 2, Box 538-G, Winter Haven, Florida 1940
Shaftesbury, Dr. Archie D., Woman's College, University of North Carolina, Greensboro, North Carolina 1937
Shanley, Mrs. Mary A., c/o Pitometer Co., 50 Church St., New York 17, New York 1952
Sharp, Barton L[amar], 201 N. Broad St., Lititz, Pennsylvania 1931
Sharp, Lucy Jane, Department of Zoology, Southern Illinois University, Carbondale, Illinois 1957
Shaub, Benjamin Martin, 159 Elm St., Northampton, Massachusetts 1947
Shaughnessy, Winslow M., 657 Forest Ave., Glen Ellyn, Illinois 1953
HLEM Shaver, Dr. Jesse M[ilton], 1706 Linden Ave., Nashville 12, Tennessee ..... (1924) 1932
Shaw, Miss Catherine D., 519½ N. Gramercy Place, Los Angeles, California 1954
L Shaw, Henry S[outhworth], 3048 Renatta Drive, Largo, Florida 1916
Shearer, Dr. Amon R[obert], Mont Belvieu, Chambers Co., Texas .. 1905
Sheehan, Robert R[aymond], 815 Classen St., Norman, Oklahoma ... 1952
L Sheffler, William J[ames], 4731 Angeles Vista Blvd., Los Angeles, California 1928
Sheldon, Esther Almy, South Lansing, New York 1954
Sheldon, Dr. William G[ulliver], Wildlife Department, University of Massachusetts, Amherst, Massachusetts 1950
Shellenberger, Emmett L., Akron Museum of Natural History, 500 Edgewood Ave., Akron 7, Ohio 1954
Shelton, Lawrence Andrew, P. O. Box 431, Battle Mountain, Nevada 1956
Shelton, Leonard A[gee], 313 First National Bldg., Pomona, California 1947
Shetler, Stanwyn Gerald, Department of Botany, Cornell University, Ithaca, New York 1955
Shepard, Frank P[arsons], Jr., Meadow Lane, Greenwich, Connecticut 1950
Shepherd, Prentiss, Jr., 80 Court St., Exeter, New Hampshire 1946
Shepherd, William M[artin], Box 414, Kenner, Louisiana 1952
Short, Lester L[eRoy], Jr., Fernow Hall, Cornell University, Ithaca, New York 1952
Short, Wayne, 1130 Fifth Ave., New York 28, New York 1943

EM Shortt, Terence Michael, Royal Ontario Museum of Zoology, Toronto, Ontario, Canada ..... (1931) 1943
Shoup, Herald H., Box 133, Middlebury, Indiana 1957
Shreve, Benjamin, 29 Chestnut St., Salem, Massachusetts 1933
LF Sibley, Dr. Charles G[ald], Fernow Hall, Cornell University, Ithaca, New York ..... (1939) 1955
Sibley, Fred C[harles], R. D. 1, Alpine, New York 1954
Sick, Dr. Helmut, Fundacao Brasil Central, Avenida Nilo Pecanha 23 III, Rio de Janeiro, Brasil 1947
Sieger, Miss Vera E., 10058 Aurora Ave., Detroit 4, Michigan 1954
Simkin, Donald W., Box 681, Ontario Agriculture College, Guelph, Ontario, Canada 1956
L Simmons, Edward McIlhenny, Avery Island, Louisiana 1941
L Simmons, Grant G[ilbert], Jr., Lake Ave., Greenwich, Connecticut 1948
L Simmons, Grant G[ilbert], Sr., Wiccafold, Greenwich, Connecticut .. 1949
Simmons, Mrs. William W. [Amelia], 2742 N. Maryland, Milwaukee 11, Wisconsin 1946
Simon, Stephen W[istar], Blue Mount Rd., Monkton, Balto County, Maryland 1948
Simpson, James M., 4249 N. 34 St., Phoenix, Arizona 1957
Simpson, Dr. Thomas W., 601 Reynolds Bldg., Winston-Salem, North Carolina 1936
Singh, Ram S[hwar], Museum of Natural History, Georgetown, British Guiana 1946
Singleton, A[lbert] Roland, 3968 Marburg Ave., Cincinnati 9, Ohio 1947
Sisson, Mrs. Clyde [Kay Curtis], 1617 Tanglewood Rd., Columbia 4, South Carolina 1951
Skaggs, Merit B[ryan], Dodd Rd., Route 3, Willoughby, Ohio 1951
Skillen, Dr. Donald R[alph], 419 Garfield Ave., South Pasadena, California 1929
LF Skutch, Dr. Alexander F[rank], Finca "Los Cusingos," San Isidro del General, Costa Rica ..... (1930) 1946
Slack, Miss Mabel, 1004 Everett Ave., Louisville, Kentucky 1937
Sladen, Dr. William J. L., c/o Dr. Curt Richter, Johns Hopkins Hospital, Baltimore 5, Maryland 1956
Slater, Miss H. Elizabeth, Churchton, Maryland 1953
L Slater, H. N., Ridgeland, South Carolina 1949
Sloan, Norman Frederick, 521 Fair St., Roseburg, Oregon 1955
Slocum, Mrs. J. Fred [Mable Oggesen], 29 Park St., Buffalo 1, New York 1951
Small, Arnold, 3028 Cavendish Dr., Los Angeles 64, California 1953
Smalley, Alfred Evans, Marine Biology Laboratory, Sapelo Island, Georgia 1947
Smart, Robert W[illiam], New Hampton School, New Hampton, New Hampshire 1957
Smiley, A[lbert] K[eith], Jr., Mohonk Lake, Ulster Co., New York 1928
Smiley, Daniel, Mohonk Lake, New York 1928
Smith, Allen G[ordon], Fish and Wildlife Service, Box 603, Brigham City, Utah 1948
Smith, Earl R., Station B., Box 5271, New Orleans, Louisiana 1921

Smith, E[lla] Esther, Box 462, Murphysboro, Illinois 1949
Smith, Miss Emily D[innin], 19651 Glen Una Dr., Los Gatos, California 1930
L Smith, George A[rthur], 211 E. Avondale Rd., Greensboro, North Carolina 1942
Smith, Gerald Ray, 921 South 8th East, Salt Lake City 2, Utah 1957
Smith, Dr. Harry M[adison], 1602 State St., Columbus, Indiana 1938
Smith, Mrs. Herman Dunlap [Ellen Thorne], 121 Stone Gate Rd., Lake Forest, Illinois 1936
HL Smith, Horace G[ardner], 1475 St. Paul St., Denver 6, Colorado 1888
Smith, Miss Marion L[ucille], 429 S. Willard St., Burlington, Vermont 1950
Smith, Melvin Charles, 1916 Fairview Blvd., Winston-Salem, North Carolina 1957
Smith, Neal G., 1751 E. 29th St., Brooklyn 29, New York 1957
Smith, Orion O., 2911 Spring Creek Rd., Rockford, Illinois 1939
Smith, Mrs. Otis H. [Anna Margaret], 207 Alexander Ave., Larkspur, California 1947
Smith, P. William, Jr., P. O. Box 735, Pasadena, California 1956
Smith, Dr. Robert B. W., 424 Windsor St., Silver Spring, Maryland .. 1953
Smith, Robert Irvin, 1712 College Apts., Logan, Utah 1955
Smith, Robert L., Department of Science and Mathematics, State University Teachers College, Plattsburgh, New York 1944
Smith, Robert Leland, U. S. Geological Survey, G. and P., Washington 25, D. C. 1952
Smith, Miss Sally, Poughkeepsie High School, Forbes St., Poughkeepsie, New York 1956
Smith, S[tuart] Craig, 46 18th Ave., Sea Cliff, New York 1955
Smith, W. John, 40 Roslyn Ave., Ottawa 1, Ontario, Canada 1957
LEM Smith, Wendell Phillips, 711 Kensington Ave., North Wilkesboro, North Carolina ..... (1919) 1937
Smith, William Walter, 673 Milverton Blvd., Toronto 6, Ontario, Canada 1947
Smithe, Frank B., 7 Center Drive, Douglaston 63, Long Island, New York 1949
Smithe, F[rank] Norton, 647 E. 14th St., Apt. 4H, New York 9, New York 1947
Smithers, Reay H. N., National Museum of Southern Rhodesia, P. O. Box 240, Bulawayo, S. Rhodesia, Africa 1953
Smolker, Robert E[liot], Department of Natural Science, Michigan State University, East Lansing, Michigan 1952
Smooker, George D[ouglas], c/o Royal Bank of Canada, West End Branch, Cockspur St., London S. W. 7, England 1926
Smyth, Dr. Thomas, State Teachers College, Shippensburg, Pennsylvania 1921
Snapp, Mrs. R[oscoe] R[aymond], 310 W. Michigan Ave., Urbana, Illinois 1947
Snider, Mrs. Patricia Rae, 3620 Gold St., Apt. 3, Los Alamos, New Mexico 1955
Snyder, Dr. Dana Paul, Department of Zoology, University of Massachusetts, Amherst, Massachusetts 1947

EM Snyder, Dorothy E[astman], The Peabody Museum, Salem, Massachusetts ..... (1943) 1955

F Snyder, L[ester] L[ynne], Royal Ontario Museum, 100 Queen's Park, Toronto, Ontario, Canada ..... (1919) 1947

Snyder, Mildred O., 2210 Oswego Ave., Aurora, Colorado 1955

Solman, Dr. Victor E[dward] F[rick], Canadian Wildlife Service, Department of Northern Affairs and National Resources, Ottawa, Ontario, Canada 1952

Sommers, Roderic W., 38 Franklin St., Medford 55, Massachusetts 1957

F Soper, J[oseph] Dewey, 7115 81st. Street, Edmonton, Alberta, Canada (1918) 1949

L Sorrill, Anna Marie [Mrs. Tom], R. R. 1, Ursa, Illinois 1948

Soulen, Thomas Kay, 227 North James St., Waukesha, Wisconsin 1957

Southern, William Edward, 614 Prairie St., Clare, Michigan 1955

Sparke, Richard W[arrick], 157 Archer St., Shreveport 64, Louisiana 1952

Sparkes, Miss Vera E[lizabeth], 2417 Lyndale Ave. N., Minneapolis 11, Minnesota 1954

L Speirs, Mrs. Doris Huestis, "Cobble Hill," R. R. 2, Pickering, Ontario, Canada 1937

Speirs, Dr. J[ohn] Murray, "Cobble Hill," R. R. 2, Pickering, Ontario, Canada 1935

Spence, Matthew J., 533 Buttonwood St., Reading, Pennsylvania ... 1957

Spencer, Don, 88 Secor Road, Scarsdale, New York 1954

Spencer, Haven, 2645 Bedford Rd., Ann Arbor, Michigan 1947

Spencer, Dr. Merrill P., 303 Wake Dr., Winston-Salem, North Carolina 1954

Spencer, Michael, 2052 Knightsbridge Rd., Ottawa 3, Ontario, Canada 1954

Sperry, Charles Carlisle, 1455 S. Franklin St., Denver 10, Colorado 1920

Spiers, Donald R[ichard], Chapel View, Melbury Osmond, Evershot, Dorset, England 1953

L Spingarn, Edward D[aniel] W[oodbury], 3400 Rodman St., N. W., Washington 8, D. C. 1924

Spofford, Dr. Walter R[ichardson], II, Department of Anatomy, State University of New York Medical Center, Syracuse, New York 1927

Springer, Paul [Frederick], Patuxent Research Refuge, Laurel, Maryland 1941

F Sprunt, Alexander, Jr., The Crescent, Charleston 44, South Carolina (1923) 1950

Sprunt, Alexander, IV, The Crescent, Charleston 44, South Carolina 1950

EM Squires, W[illiam] Austin, The New Brunswick Museum, Saint John, New Brunswick, Canada ..... (1946) 1950

Stabler, Harold B[rooke], 6123 Broad Branch Rd., Washington 15, D. C. 1937

Stabler, Dr. Robert M[iller], Colorado College, Colorado Springs, Colorado 1940

Stackpole, Richard, Wayland, Massachusetts 1937

EM Staebler, Dr. Arthur Eugene, Biology Department, Fresno State College, Fresno, California ..... (1935) 1955

EM Stager, Kenneth Earl, Los Angeles Museum, Exposition Park, Los Angeles 7, California ..... (1942) 1953

Stair, John Lester, 7331 N. 32nd Ave., Phoenix, Arizona 1955

Stallcup, Dr. William B[lackburn], Jr., Biology Department, Southern Methodist University, Dallas, Texas 1951
Staloff, Charles, 1776 Weeks Ave., Bronx 57, New York 1949
Stamm, Anne L. [Mrs. Frederick W.], 2118 Lakeside, Louisville 5, Kentucky 1946
Stanwood, Miss Cordelia J[ohnson], Birdsacre, High St., Ellsworth, Maine 1909
Stark, Earl [Vincent], 59 Chilton Rd., Toronto 6, Ontario, Canada 1948
Starr, Dr. Robert R[ussell], Howard Clinic, Glasgow, Kentucky 1949
Starrett, Andrew, Dept. Biology, U. of Southern Calif., University Park, Los Angeles 7, Calif. 1949
Stasz, Clarence E., 179 Edgewood Ave., Audubon 6, New Jersey 1953
Stauffer, Dr. R[alph] S[tanley], 208 W. Irvin Ave., Hagerstown, Maryland 1949
Stearns, Dr. Edward I[ra], 601 Lake Ave., Wilmette, Illinois 1945
Stecher, Karl, Jr., 4608 Norwood Dr., Chevy Chase 15, Maryland 1957
Steel, William C., 551 Morningside Dr., Miami Springs, Florida 1952
Stefanski, Raymond Arthur, Armstrong Creek, Wisconsin 1957
Steffen, Philip N., 2135 Balmoral Ave., Chicago 25, Illinois 1949
L Stein, Dr. Robert C[arrington], Department of Biology, Ursinus College, Collegeville, Pennsylvania 1950
Steirly, Charles C[ornell], Virginia Forest Service, Waverly, Virginia 1947
Stephens, James L[inley], Jr., P. O. Box 841, Lumberton, North Carolina 1947
Sterner, Dr. Lewis G[eorge], Byberry Rd., Somerton, Philadelphia 16, Pennsylvania 1949
Stettenheim, Peter, Museum of Zoology, University of Michigan, Ann Arbor, Michigan 1951
Stevens, Charles E[lmo], Jr., 615 Preston Pl., Charlottesville, Virginia 1946
L Stevens, John P., Jr., Stevens Bldg., Broadway at 41st St., New York 36, New York 1939
EM Stevenson, Dr. Henry M[iller], Jr., Department of Zoology, Florida State University, Tallahassee, Florida ..... (1940) 1954
EM Stevenson, James O[sborne], Fish and Wildlife Service, Department of the Interior, Washington 25, D. C. ..... (1926) 1948
Stewart, James R., Jr., United Gas Corporation, Research Laboratory, Shreveport, Louisiana 1955
Stewart, Miss Mildred, 2219 Devonshire Drive, Cleveland 6, Ohio .. 1946
L Stewart, Paul A[lva], Department of Zoology and Entomology, Ohio State University, Columbus 10, Ohio 1928
EM Stewart, Robert Earl, Patuxent Research Refuge, Laurel, Maryland (1938) 1949
Stickney, Eleanor Herrick, [Mrs. Albert, Jr.], Leetes Island Rd., Guilford, Connecticut 1933
Stiles, Bruce F[leming], 601 10th St., West Des Moines, Iowa 1939
Stillwell, Jerry E., R. R. 2, Fayetteville, Arkansas 1934
Stimson, Louis A[lbert], c/o M. C. Wardle, R. D. 1 Ring Road, Chadds Ford, Pennsylvania 1943
Stirrett, Dr. Geo[rge] M[ilton], Canadian Wildlife Service, Old Arts Bldg., Queen's University, Kingston, Ontario, Canada 1948
Stoddard, E[noch] V[ine], Gallup Lane, Waterford, Connecticut .. 1942

LF Stoddard, Herbett Lee, Sherwood Plantation, Thomasville, Georgia (1912) 1936
Stokes, Dr. Allen W., Department of Wildlife Management, U. S. A. C., Logan, Utah 1947
Stokes, H[enry] Ernest, 1519 Marlboro Ave., Hartsville, South Carolina 1957
Stone, Dr. Charles T., Jr.-4514 Avenue N 1/2, Galveston, Texas 1955
Stone, Edgar Norman, 3867 Washington St., San Francisco, California 1954
L Stoner, Mrs. Dayton, 399 State St., Albany 6, New York 1946
Stoner, Emerson A[ustin], 285 E. "L" St., Benicia, California 1922
Stophlet, John J[ermain], 2612 Maplewood Ave., Toledo, Ohio 1937
Storer, John H[umphreys], 440 Henkel Circle, Winter Park, Florida 1937
LF Storer, Dr. Robert W[inthrop], Museum of Zoology, University of Michigan, Ann Arbor, Michigan ..... (1935) 1952
EM Storer, Dr. Tracy Irwin, Department of Zoology, University of California, Davis, California ..... (1916) 1922
Storrie, Miss Robina, 443 S. Corona St., Denver 9, Colorado 1941
Stott, Kenhelm W[elburn], Jr., 3040 Helix St., Spring Valley, California 1944
Stotts, Vernon DeForest, Mattapex Farm, Stevensville, Maryland .. 1956
Stout, Gardner D., 14 Wall St., New York 5, New York 1952
Stout, R. Gwynne, Edge Hill, Glen Road, Ardmore, Pennsylvania .. 1940
Straw, Richard M[yron], Division of Natural Sciences, Los Angeles State College, 855 North Vermont Ave., Los Angeles 29, California 1946
EM Street, Phillips B[orden], Route 1, Chester Springs, Pennsylvania (1946) 1952
L Strehlow, Elmer W., P. O. Box 1443, Milwaukee 1, Wisconsin 1945
Stringham, Emerson, Box 986, Kerrville, Texas 1941
Strong, Alden M., c/o H. H. Roberts, Westport, Ontario, Canada 1952
F Strong, Dr. Reuben M[yron], 5716 Stony Island Ave., Chicago 37, Illinois ..... (1889) 1919
Stuart, Lyman K., 501 West Maple Ave., Newark, New York 1956
Stull, Dr. William D[eMott], Rt. 1, Delaware, Ohio 1953
EM Stupka, Arthur, Route 1, Gatlinburg, Tennessee ..... (1934) 1948
Sturdevant, Carleton A[ustin], R. D. 1, Prattsburg, New York 1949
L Sturgeon, Myron T[homas], Department of Geography and Geology, Ohio University, Athens, Ohio 1938
Sturges, Franklin W., 1587 Brook Lane, Corvallis, Oregon 1953
L Sugden, Martin [James Jaffrey], 16 Alexandra Blvd., Toronto 12, Ontario, Canada 1952
Sullivan, Edward G., P. O. Box 523, Grenada, Mississippi 1957
Summers, Dr. Lawrence, c/o University of North Dakota, Grand Forks, North Dakota 1953
EM Sumner, [Eustace] Lowell, Jr., Three Rivers, California ..... (1926) 1938
Sumner, Mrs. Lowell, Three Rivers, California 1933
Sumner, Ruth A[llerton], 420 N. 48th St., Omaha 3, Nebraska 1949
Sundell, Robert [Arnold], 94 Main St., Frewsburg, New York 1948
Suthard, James G[regory], 1881 Raymond Ave., Long Beach 6, California 1923
Suthers, Hannah Bonsey [Mrs. Derwent A.], 163 Newman Rd., Rt. 2, Williamston, Michigan 1954

LF Sutton, Dr. George Miksch, University of Oklahoma, Norman, Oklahoma ..... (1910) 1936
Swackhamer, Farris S., c/o Shell Chemical Corporation, 380 Madison Ave., New York 17, New York 1956
Swanson, Carl V[ernon], 8824 Mt. Rainier Dr., Vancouver, Washington 1952
EM Swanson, Dr. Gustav A., Fernow Hall, Cornell University, Ithaca, New York ..... (1928) 1947
Sweatman, G[ordon] K[enneth], P. O. Box 254, Macdonald College, Quebec, Canada 1950
Swedenborg, E[rnie] D[avid], 4905 Vincent Ave., S., Minneapolis, Minnesota 1927
Sweet, Dr. Herman R., Department of Biology, Tufts College, Medford, Massachusetts 1942
Swift, Isabel H[owland], 3 Hackett Circle W., Stamford, Connecticut 1949
Swigart, Edmund K[earsley], Ferry Bridge Rd., Washington, Connecticut 1951
Swinebroad, Jeff, Department of Botany and Zoology, Douglass College, Rutgers University, New Brunswick, New Jersey 1951
EM Taber, Wendell, 33 Lexington Ave., Cambridge 38, Massachusetts (1933) 1948
Tabor, Miss Ava R[ogers], 305 Canal Ave., Thibodaux, Louisiana 1937
Taft, Elizabeth A., 504 N. Blakely St., Dunmore Station, Scranton, Pennsylvania 1940
Taft, John E., 352 Glen Ellen Dr., Ventura, California 1957
Tainter, Mrs. Fern R., 226 Berkeley St., Salt Lake City 9, Utah 1956
Tainter, Miss Grace, 161 Emerson Place, Brooklyn 5, New York 1952
Tallman, William S[weet], Jr., 4 Linden Place, Sewickley, Pennsylvania 1942
Talmadge, Robert R., Box 71, Willow Creek, California 1947
Tancock, [Montague] Monty A., 425 Crocker Rd., Sacramento 19, California 1950
Tanger, Louise F[orney] A[rnold], 318 N. President Ave., Lancaster, Pennsylvania 1949
Tanghe, Leo J[oseph], 852 Stone Road, Rochester 16, New York .. 1949
Tanguay, Rev. Abbé René, Ste. Ann's College, Ste. Ann de la Pocatière, Kamouraska Co., Quebec, Canada 1944
EM Tanner, Dr. James T[aylor], Department of Zoology, University of Tennessee, Knoxville, Tennessee ..... (1933) 1947
Tashian, Dr. Richard E[arl], Columbia University, 413 West 117th St., New York 27, New York 1949
Tasker, Dr. Ronald Reginald, 180 Crescent Rd., Apt. 2, Toronto, Ontario, Canada 1952
Taylor, Herbert S[tanton], 1369 Fair Ave., Columbus 5, Ohio 1948
Taylor, James E., Jr., 1504 Westbrook - Apt. D., New Orleans, Louisiana 1956
Taylor, Kenneth, 128 Charles St., New York 14, New York 1956
Taylor, Dr. Lewis Walter, Department of Poultry Husbandry, University of California, Berkeley 4, California 1925
Taylor, Dr. R[obert] L[incoln], 661 Inverness Dr., Flintridge, Pasadena 3, California 1947

HLEM Taylor, Dr. Walter Penn, 424 W. Harrison Ave., Claremont, California ..... (1916) 1950
Taylor, William E., 4667 Ironwood, Saginaw, Michigan 1952
Teachenor, Dix, 1020 West 61st St., Kansas City 15, Missouri 1919
Teal, Dr. John M., University of Georgia, Department of Biology, Marine Biology Laboratory, Sapelo Island, Georgia 1957
Teale, Edwin Way, 93 Park Ave., Baldwin, Long Island, New York 1947
Teeple, Stanley Melvin, Perth Road, Ontario, Canada 1957
Terborgh, John W., 4582 26th St., North, Arlington 7, Virginia 1954
Terney, George E., 558–15th Ave., San Francisco 18, California 1956
Terres, J[ohn] Kenneth, 345 E. 57th St., New York 22, New York .. 1934
EM Terrill, Lewis McIver, Ulverton, P/Quebec, Canada ..... (1907) 1947
EM Terry, Mrs. R. A. [Mary Ella McClellan Davidson], 1521 Escobita Ave., Palo Alto, California ..... (1920) 1932
Terry, Dr. Robert J[ames], University Club, St. Louis 3, Missouri 1919
Thacher, Louis B[artlett], Jr., 541 Gay St., Westwood, Massachusetts 1931
Thaeler, Charles S[chropp], Jr., 2214 Haste St., Berkeley 4, California 1953
Thatcher, Donald M[ason], 2916 Perry St., Denver 12, Colorado 1946
EM Thomas, Dr. Edward S[inclair], Ohio State Museum, Columbus 10, Ohio ..... (1922) 1941
Thomas, Gerald B[amber], 3339 W. 82nd. St., Inglewood, California 1949
Thomas, Landon B., 1006 Blaine St., Edgerton, Wisconsin 1947
Thomas, Lester S[t. John], Churchville, Pennsylvania 1954
EM Thomas, Ruth Harris [Mrs. Rowland], 410 E. Green St., Morrilton, Arkansas ..... (1935) 1950
Thompson, Daniel Q[uale], Ripon College, Ripon, Wisconsin 1949
Thompson, Mrs. Edwin V., 15 Poplar Hill Rd., Blankenbaker Lane, Louisville 7, Kentucky 1954
Thompson, Evan Gwynne, 5007 Doliver Drive, Houston 19, Texas 1956
Thompson, James D[illey], Jr., 509½ Polk St., Amarillo, Texas ... 1951
Thompson, Dr. John Q. U., 1958 River Road, Jacksonville 7, Florida 1956
Thompson, Miss Katrina, 2039 Milford, Houston 6, Texas 1956
Thompson, Lovell, Houghton Mifflin Co., 2 Park St., Boston 7, Massachusetts 1955
Thompson, Max Clyde, Udall, Kansas 1957
Thompson, Reynolds Wardell, 537 Verna Hill Rd., Fairfield, Connecticut 1955
Thompson, William Lay, Department of Zoology, University of California, Berkeley 4, California 1953
Thomson, Isabel A., 5939 Shafter Ave., Oakland 18, California 1952
Thomson, Miss Mary W., 1210 Ragnet Ct., Nacogdoches, Texas 1957
Thorley, Robert F., 8 Midland Gardens, Bronxville 8, New York .. 1947
Thornburg, Ashley A[lvin], 1208 No. Vine, Victoria, Texas 1950
L Thorne, Oakleigh, II, 1707 Hillside Rd., Boulder, Colorado 1947
Thornton, William James, P. O. Box 1011, Birmingham, Alabama 1938
L Thorp, George B[oulton], Carnegie Institute of Technology, Pittsburgh 13, Pennsylvania 1935
Thorpe, James D[avid], 9 Elmdale Ave., Akron 13, Ohio 1942
Thorson, Dr. Thomas B[ertel], Department of Zoology, University of Nebraska, Lincoln, Nebraska 1948

	Throne, Alvin L[eroy], University of Wisconsin, Milwaukee 11, Wisconsin	1954
	Thurston, Henry, Box 214, Montrose, New York	1947
	Tice, Standford Charles, 78 Manhattan Ave., New York 25, New York	1956
	Tillman, Dr. Clifford, 492 Cherokee Park, Natchez, Mississippi	1957
	Todd, H[enry] O[liver], Jr., P. O. Box 259, 105 Spring St., Masonic Bldg., Murfreesboro, Tennessee	1939
F	Todd, W[alter] E[dmond] Clyde, Carnegie Museum, Pittsburgh 13, Pennsylvania (1890)	1916
	Tomer, John S[haffer], 4045 East 27th St., Tulsa 14, Oklahoma	1957
	Tomich, P[rosper] Quentin, Department of Zoology, University of California, Davis, California	1945
EM	Tomkins, Ivan Rexford, 1231 E. 50th St., Savannah, Georgia (1928)	1939
L	Tompkins Victor N[orman], 524 Madison Ave., Albany 3, New York	1949
	Toner, George Clive, 17 Amelia St., Toronto 5, Ontario, Canada	1948
F	Tordoff, Dr. Harrison B., Museum of Zoology, University of Michigan, Ann Arbor, Michigan (1944)	1957
L	Tousey, Miss Katherine, 22 Grand View Ave., Somerville 43, Massachusetts	1935
	Tousey, Dr. Richard, 6625 Oxon Hill Rd., S. E. Washington 21, D. C.	1943
	Towe, J[ay] Troy, General Delivery, Cana, Virginia	1949
	Townes, George F[ranklin], 209 Masonic Temple, Greenville, South Carolina	1953
	Townsend, Miss Elsie W., Department of Biology, Wayne University, Detroit 1, Michigan	1951
	Toyne, Mrs. George W., 1110½ Iowa Ave., Muscatine, Iowa	1952
	Trainer, John E[zra], Muhlenberg College, Department of Biology, Allentown, Pennsylvania	1937
	Trask, Dr. Parker Davies, 240 Southampton Ave., Berkeley 7, California	1936
F	Trautman, Dr. Milton B[ernhard], Ohio State Museum, Columbus 10, Ohio (1924)	1955
	Travis, Vaud A., 1611 Monta, Muskogee, Oklahoma	1956
EM	Traylor, Melvin A[lvah], Jr., 759 Burr Ave., Winnetka, Illinois (1940)	1950
L	Treacy, Edward D[aniel], 14 Church St., Highland Falls, New York	1957
L	Trivette, Lt. Edward C[arroll], Baldwin, Maryland	1950
	Trost, Charles H., 1019 Walnut St., Erie, Pennsylvania	1953
	Trowern, Robert Wilson, 42 Van Dusen Blvd., Toronto, Ontario, Canada	1947
	Truslow, Frederick Kent, 34 Hillcrest Ave., Summit, New Jersey	1957
	Tryon, Clarence Archer, Jr., Department of Biological Sciences, University of Pittsburgh, Pittsburgh 15, Pennsylvania	1947
	Tuck, Leslie M., Dom. Wildlife Officer, Water Street, St. John's, Newfoundland	1947
L	Tucker, Mrs. Carll, 733 Park Avenue, New York, New York	1924
L	Tufts, Dr. Harold F[reeman], Port Mouton, Queen's County, Nova Scotia, Canada	1947
	Tulinoff, A[ntonine] V., 1255 Wyoming Ave., Niagara Falls, New York	1949
	Turner, James H[oward], Box 691, Holloman Air Force Base, New Mexico	1951

Tutton, Terry T., Palmyra, Wisconsin 1956
Twiss, Dr. A. R[obert], 2359 Gails Avenue, Chehalis, Washington .. 1955
EM Twomey, Dr. Arthur C[ornelius], Carnegie Museum, Pittsburgh, Pennsylvania ..... (1930) 1946
Tyrrell, W[illiam] Bryant, 246 Park Ave., Takoma Park 12, Maryland 1940
Udvardy, Dr. M[iklos] D[exso] F[erenc], Department of Zoology, University of British Columbia, Vancouver, British Columbia, Canada 1953
EM Uhler, Francis M[orey], Fish and Wildlife Service, Patuxent Research Refuge, Laurel, Maryland ..... (1924) 1937
Ulrich, Mrs. Alice E., 193 La Salle Ave., Buffalo 14, New York 1935
Ulrich, Edward C., 193 La Salle Ave., Buffalo 14, New York 1935
L Underdown, Henry T[ener], 8216 Manor Rd., Elkins Park 17, Pennsylvania 1921
Urban, Emil K[arl], Museum of Natural History, University of Kansas, Lawrence, Kansas 1956
Ussher, R[ichard] D[avey], R. R. 1, Morpeth, Ontario, Canada .. 1931
Vaden, Virginia [Mozelle], 4325 Bowser Ave., Dallas 19, Texas 1956
Vaiden, M[eredith] Gordon, Rosedale, Mississippi 1936
Valentine, Allen Eugene, 2335 Walters Rd., Westlake, Ohio 1954
Van Cleve, G. Bernard, 323 S. Fairmount St., Pittsburgh 32, Pennsylvania 1954
L Vanderbilt, Mrs. Anne Colby, Englewood, Florida 1957
Vandermeer, Dr. B[illy] L[ee], 5087 South 10th East, Salt Lake City, Utah 1951
Van Deusen, Hobart Merritt, 12 Highland Ave., Montclair, New Jersey 1937
Van Dyke, Rev. Tertius, Washington, Connecticut 1930
Vanek, Mrs. Charles W., 7441 Reuter Ave., Dearborn 1, Michigan 1954
Van Eseltine, Dr. William Parker, Department of Veterinary Hygiene, School of Veterinary Medicine, University of Georgia, Athens, Georgia 1944
L Van Fleet, Clark C., Box 696 Lakeport, Lake County, California 1947
Van Gelder, Richard G[eorge], Department of Mammals, American Museum of Natural History, Central Park West at 79th St., New York 24, New York 1955
Van Horn, Donald H., Biology Department, University of Colorado, Boulder, Colorado 1952
Van Huizen, Peter J., White River National Wildlife Refuge, St. Charles, Arkansas 1939
HL Van Name, Willard Gibbs, American Museum of Natural History, Central Park West at 79th St., New York 24, New York 1900
Van Vleck, Mrs. David B., The Loomis School, Windsor, Connecticut 1957
Van Wart, Mrs. Marjory Powell, 143 Union Ave., Amityville, New York 1956
Vaughan, Terry Alfred, Museum of Natural History, University of Kansas, Lawrence, Kansas 1957
Vaughan, William C[oleman], Church Street, Youngstown, New York 1935

F Vaurie, Dr. [Auguste Jean] Charles, American Museum of Natural History, Central Park West at 79th St., New York 24, New York (1944) 1954

Verges, Eugene M[arcelin], II, 1126 Beacon St., Brookline, Massachusetts ... 1931

Verner, Jared, 604 East "C" St., Moscow, Idaho ... 1956

EM Vogt, William W., 410 Central Park West, New York 25, New York (1928) 1936

Vollmar, Mrs. R[hea] Lewis, 6138 Simpson Ave., St. Louis 10, Missouri 1949

von Bloeker, Prof. Jack C[hristian], Jr., Life Sciences Department, Los Angeles City College, Los Angeles 29, California ... 1941

von der Heydt, James A[rnold], P. O. Box 156, Nome, Alaska ... 1953

Vore, Marvin E[lmer], 1128 N. 8th Ave., West Bend, Wisconsin ... 1949

Wachenfeld, Mrs. William A., 787 E. Clarke Place, Orange, New Jersey ... 1953

Wade, Mrs. Jeptho H., 251 Old Billerica Rd., Bedford, Massachusetts 1957

Wagner, Mrs. Julia E[lizabeth], 818 E. Boulder St., Colorado Springs, Colorado ... 1949

Wainwright, C[arroll] L[ivingston], Jr., One East End Ave., New York 21, New York ... 1950

I. Walgreen, Mrs. Charles R., 3240 Lake Shore Dr., Chicago 13, Illinois 1951

EM Walker, Dr. Charles F[rederic], Museum of Zoology, University of Michigan, Ann Arbor, Michigan ... (1927) 1944

Walker, Jason A[lison], 89 Church St., Waterloo, New York ... 1948

Walker, Dr. Roland, Rensselaer Polytechnic Institute, Biological Laboratory, Troy, New York ... 1924

Walker, Mrs. Stuart, Block House Ranch, Leander, Texas ... 1957

LF Walkinshaw, Dr. Lawrence H[arvey], 1703 Wolverine Tower, Battle Creek, Michigan ... (1929) 1951

EM Wallace, Dr. George J[ohn], 517 Ann St., East Lansing, Michigan (1935) 1945

Wallace, Roy Frederick, 63 Dupont St., Toronto 5, Ontario, Canada 1947

Wallace, Tom, Louisville Times, Louisville 2, Kentucky ... 1954

Walsh, David Alfred, Box 223, College, Alaska ... 1953

Walter, Cedric N[orman], 32 Stanley Ave., Beckenham, Kent, England 1948

Walters, Frank, Hollis, New Hampshire ... 1902

Wanamaker, John, Principia College, Elsah, Illinois ... 1946

Wanek, Mrs. Ernest E., [Anna N.], 5 Davidson Ave., Ramsey, New Jersey ... 1953

Wanless, Harold R., 127 Natural History Bldg., University of Illinois, Urbana, Illinois ... 1947

Wanzer, James Olin, 3601 56th St., Sacramento 20, California ... 1947

Ward, Rodman, R. D. 1, Kennett Square, Pennsylvania ... 1957

Warfield, Ben[jamin] Breckinridge, 3223 Volta Place, N. W., Washington 7, D. C. ... 1930

Warham, John, c/o Aust. & N. Z. Bank Ltd., Town Hall Branch, 608 Hay St., Perth, Western Australia ... 1952

Waring, John D., Anzac, Alberta, Canada ... 1953

Warkley, John C., 700 South Beech St., Casper, Wyoming ... 1956

EM Warner, Dr. Dwain W., Museum of Natural History, University of Minnesota, Minneapolis, Minnesota ... (1942) 1951

Warren, Donald H., 52 South Ireland Place, Amityville, L. I., New York 1955
Warters, Miss Mary Ellen, 5115 Woodland Ave., Des Moines 12, Iowa 1951
Washington, Mrs. Whiting, Trail's End, North Edgecomb, Maine 1947
Wasserfall, William, 22 Roycrest Ave., Lansing, Ontario, Canada 1952
Waters, Joseph Hemenway, 24 Winter Street, Whitman, Massachusetts 1955
Watson, B. B., 422 Sunny Lane, Tyler, Texas 1957
Watson, C[harles] G[ray], 201 Ridout St., S., London, Ontario, Canada 1919
Watson, Frank G[raham], Stony Acres, Route 2, Westport, Connecticut 1936
Watson, George Elden, III, Osborn Zoological Laboratory, Yale University, New Haven 11, Connecticut 1957
Watson, Robert J., P. O. Box 75, Blacksburg, Virginia 1947
Weart, Miss Edith L[ucie], 35–36 76th St., Jackson Heights, New York 1946
Weaver, Miss Madeline M[ary], 161 Norton St., Rochester 21, New York 1953
Webb, Edward L[loyd], 254 E. 2nd St., Mesa, Arizona 1955
Webb, John S[idney], 1444 W. St. Charles Street, Brownsville, Texas 1957
Weber, Jay Anthony, 10775 N. Bayshore Drive, Miami 38, Florida .. 1907
Webster, Clark G[ibbons], Patuxent Research Refuge, Laurel, Maryland 1948
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Webster, Randall, 341 Western Ave., Brookville, Pennsylvania 1937
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Weeks, Glenn, 218 Plain Rd., Greenfield, Massachusetts 1954
Weeks, [Willie Person] Magnum, 219 North Royal St., Alexandria, Virginia 1938
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Weigel, Robert D., Department of Biology, University of Florida, Gainesville, Florida 1956
Weise, Charles M[artin], Department of Zoology, University of Wisconsin, Milwaukee 3, Wisconsin 1948
Weiser, Charles S[pangler], Wyndham Hills, York, Pennsylvania .. 1916
Weller, Milton W[ebster], Wildlife Cons. Bldg., Columbia, Missouri 1952
Wellings, Dr. S[efton] R[obert], 230 Parnassus Ave., San Francisco, California 1949
Wellman, Mrs. Cora B., Bank Village R. D., Greenville, New Hampshire 1954
Wells, LaRue, 807 W. Liberty, Ann Arbor, Michigan 1952
Welty, [Joel] Carl, R. 1, Beloit, Wisconsin 1948
Wendt, Miss Lorina M., Apt. 404, 2377 Champlain St., N. W., Washington 9, D. C. 1946
Werner, James Russell, P. O. Box 145, Goodyear, Arizona 1956
Werner, Ray C[owles], 758 Wildwood Rd., N. E., Atlanta 9, Georgia 1947
Werner, Mrs. Tyrrell H., 100 Tolman St., Cumberland Mills, Maine 1952
Wesseling, Kurt [Paul], Jr., 9852 Madison, Rock Hill 19, Missouri 1949

West, David A., Fernow Hall, Cornell University, Ithaca, New York 1954
West, Mrs. E[ugene] M. [Adele Hooker], 2914 Haywood Ave., Apt. 1–D, Chattanooga 5, Tennessee 1951
West, George C[urtiss], Vivarium Bldg., Wright and Healey Sts., Champaign, Illinois 1951
West, Henry C[lopton], 4660 East 42nd St., Indianapolis 18, Indiana 1950
F Weston, Francis Marion, 2006 E. Jordan St., Pensacola, Florida (1925) 1953
Weston, Dr. Henry G[riggs], Jr., Department of Biological Sciences, San Jose State College, San Jose 14, California 1943
Wetherbee, David Kenneth, R. F. D., Hampton, Connecticut 1945
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LF Wetmore, Dr. Alexander, Smithsonian Institution, Washington 25, D. C. ..... (1908) 1919
Weydemeyer, Winton [William], Fortine, Montana 1925
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L Wharton, William Pickman, Groton, Massachusetts 1907
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, Williams, Lovett Edward, Jr., 2111 N. Monticello Dr., Tallahassee, Florida 1957
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L Williams, Ralph Ben, Box 2354, Juneau, Alaska 1942
Williams, Raymond E[well], 1036 S. Bradshawe Ave., Monterey Park, California 1950
Williams, Robert J[ackson], 1028 Clymer Place, Madison 5, Wisconsin 1956
Williams, William E[rnest], 183 Dewbourne Ave., Toronto 10, Ontario, Canada 1951
Williamson, Francis S[idney] L[anier], Arctic Health Research Center, P. O. Box 960, Anchorage, Alaska 1949
Willis, Cornelius G[rinnell], 1 Carter Ave., Sierra Madre, California 1948
Willis, Edwin [O'Neill], 1631 Gail Road, Baltimore 21, Maryland .. 1952
Willis, Myra G., 1720 6th Ave., S. E., Cedar Rapids, Iowa 1949
Willms, A[lbert] George, Route 2, Urbana, Illinois 1952
Willoughby, John E[rnest], 106 Worden Ave., Ann Arbor, Michigan 1947
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Wilson, Archie F[rancis], 390 Hartshorn Dr., Short Hills, New Jersey 1937
Wilson, Bruce V., 815 N. Chipman St., Owosso, Michigan 1947
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Wilson, Vanez T., Bear River Migratory Bird Refuge, Brigham, Utah 1947
Wilton, Dr. Christine, Box 123, East Carolina College, Greenville, North Carolina 1954
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L Wineman, Andrew, 150 Michigan Ave., Detroit 26, Michigan 1932
Winford, Mrs. Edith E[mmons], 1022 South Windomere, Dallas 8, Texas 1957
Wing, Mrs. Anne Hinshaw, 3875 Vorhies Rd., Ann Arbor, Michigan 1948
L Wing, Harold F., 7165 Bunker Hill Rd., Jackson, Michigan 1942

EM	Wing, Dr. Leonard W[illiam], 3875 Vorhies Rd., Ann Arbor, Michigan (1929)	1945
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	Winn, Dr. Hudson S[umner], Department of Biology, New York State College for Teachers, Albany 3, New York	1949
	Winship, Wilfred L. D., Rt. 4, Box 290, Corpus Christi, Texas	1957
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	Wolff, John L[udwig], Furnace Woods Rd., R. F. D. 1, Peekskill, New York	1948
F	Wolfson, Dr. Albert, Northwestern University, Evanston, Illinois (1941)	1952
L	Wolk, Robert G[eorge], Department of Biology, St. Lawrence University, Canton, New York	1952
	Wood, Charles 159 Summit St., East Providence 14, Rhode Island	1950
	Wood, Dr. Harold Bacon, 3016 North Second St., Harrisburg, Pennsylvania	1929
	Wood, Dr. Merrill, Department of Zoology and Entomology, Pennsylvania State University, University Park, Pennsylvania	1927
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EM	Woodbury, Dr. Angus M[unn], 248 University St., Salt Lake City 2, Utah ..... (1942)	1950
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L	Woods, Robert, P. O. Drawer 32, Covina, California	1926
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L	Woodward, Miss Barbara, R. F. D. 2, Guilford, Maine	1946
L	Woodward, Sarah J[ones], 110 Warren St., Concord, New Hampshire	1950
L	Woolfenden, Glen E[verett], Department of Biology, University of Florida, Gainesville, Florida	1947
	Woolfenden, Mrs. Harriet B[ergtold], Ter. 6, 4600 Firestone Ave., Dearborn 2, Michigan	1951
	Woolman, Edward, Haverford, Pennsylvania	1925
L	Work, Dr. Telford H., The Rockefeller Foundation, Virus Research Centre, P. O. Box 11, Poona 1, India	1944
	Worrell, Mrs. Dorothy O., 531 Ceylon St., Eagle Pass, Texas	1956
	Worth, Dr. C[harles] Brooke, 516 Walnut Lane, Swarthmore, Pennsylvania	1927
	Worthley, Dr. Elmer G., Bonita Ave., Owings Mills, Maryland ..	1953
EM	Wright, Dr. Albert [Hazen], 113 E. Upland Rd., Ithaca, New York (1906)	1919

L Wright, Bruce S[tanley], Northeastern Wildlife Station, University of New Brunswick, Fredericton, New Brunswick, Canada 1946
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Wylie, William Lewis, Pleasant Valley Sanctuary, Lenox, Massachusetts 1949
LEM Wynne-Edwards, V[ero] C[opner], Natural History Department, Marischal College, University of Aberdeen, Aberdeen, Scotland (1930) 1936
Yarding, Miss Crystal W., 1220 E. 4th St., Tucson, Arizona 1957
Yatsuhashi, Dr. Masao, 66 Beals St., Brookline 46, Massachusetts .. 1941
Yeatman, Harry C[lay], Department of Biology, University of the South, Sewanee, Tennessee 1947
EM Yeatter, Dr. Ralph Emerson, Illinois State Natural History Survey, Urbana, Illinois ..... (1926) 1948
Yocom, Dr. Charles F[rederick], Game Management Department, Humboldt State College, Arcata, California 1947
Yoder, Robert G., 1147 N. Park Ave., Tucson, Arizona 1957
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Zoradi, Timothy, 14 Sidney Place, Brooklyn 1, New York 1957
Zukoski, Dr. and Mrs. Charles Frederick, 1815 Windsor Blvd., Birmingham 9, Alabama 1957
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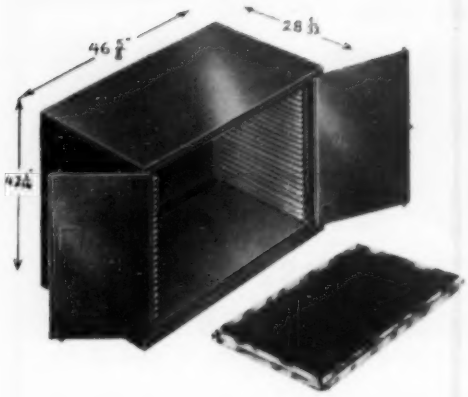

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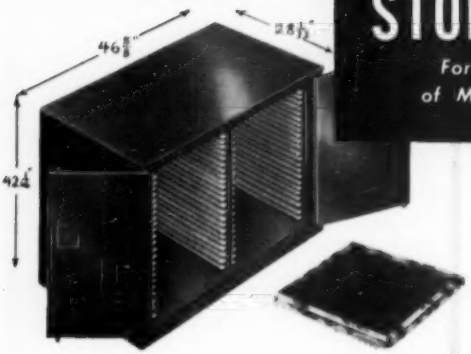

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